A56
:80
.2

N. C.
Doc.

A. E. INFORMATION SERIES NO. 80
DEPARTMENT OF AGRICULTURAL ECONOMICS
NORTH CAROLINA STATE COLLEGE
RALEIGH, NORTH CAROLINA
NOVEMBER, 1960

Economic Opportunities For Adjustments on Tobacco Farms in the Central Coastal Plain, North Carolina

Digitized by the Internet Archive
in 2023 with funding from
State Library of North Carolina

https://archive.org/details/economicopportun00paso

Economic Opportunities For Adjustments on Tobacco Farms in the Central Coastal Plain, North Carolina

E. C. Pasour, Jr.

W. D. Toussaint

A. E. Information Series No. 80
Department of Agricultural Economics
North Carolina State College
Raleigh, North Carolina
November 1960

PREFACE

This is another in a series of research publications designed to aid North Carolina farmers in making farm adjustments to improve their incomes. The results of this study pertain specifically to the Central Coastal Plain, but much of the information is applicable to other areas of the state as well. Other research studies of a similar nature have been and are being carried out in other areas of the state.

The authors are indebted to R. A. King, Q. W. Lindsey, and P. S. Stone for their helpful comments on the manuscript. B. B. Bhattacharyya was very helpful in setting up the computational work. Thanks are due Mrs. Teddy Kovac for her conscientious work on the calculations and for drawing the figures.

W. D. Lewis, Wilson County Agricultural Agent, was especially helpful throughout all phases of the study. Further, the authors wish to thank the 12 Wilson County farmers who kept records on their farming operations and helped provide data used in this study. These farmers gave freely and cheerfully of their time. For this we are indebted to Clifford Aycock, Jarvis Baker, L. T. Batts, Paul Boyette, James Cherry, Kenneth Fulghum, W. T. Holland, Cornelius Jordon, Rudolph Outland, Zell Smith, Kinchen Walston, and Kernie Watson.

TABLE OF CONTENTS

Page
PROBLEM AND OBJECTIVES 5
PROCEDURE 7
- Enterprise Budgets 7
- Resources per Unit of Net Return 8
- Net Revenue 10
- Resource Restrictions 10
- Off-Farm Work 15

ADJUSTMENT OPPORTUNITIES 15
- Single Units 15
- Multiple Units 26

EFFECTS OF CHANGES IN SELECTED PRODUCT PRICES AND RESOURCE COSTS ON MOST PROFITABLE ENTERPRISE COMBINATIONS 31
- Changes in Prices of Cotton and Sweet Potatoes 31
- Changes in Wage Rate and Cost of Renting Land 35
- Changes in Tobacco Price and Cost of Renting Land 39
- Changes in Interest Rate and Cost of Renting Land 43

IMPLICATIONS 46
- Conditions Influencing Crop and Livestock Production 46
- Resource Adjustments 50
- Sharecroppers or Hired Labor 52
- Age of Operator 53
- Level of Management 53

SUMMARY

Tobacco is the chief source of farm income in the Central Coastal Plain of North Carolina. Consequently, farmers in this area have been particularly affected by recent cuts in flue-cured tobacco allotments. The purpose of this study is to evaluate opportunities for increasing incomes to families on farms with varying amounts of land, labor, and capital.

Records from the Agricultural Stabilization and Conservation office in Wilson County were used as a basis for developing modal acreages of cropland to represent farm situations of the entire Central Coastal Plain. The resource situations selected included five farms having 15.5, 29.0, 52.0, 75.0, and 121.0 acres of cropland. Flue-cured tobacco allotments by farm size were 2.6, 4.3, 7.5, 10.8, and 17.2 acres, respectively. The 75- and 121-acre farms were multiple-unit operations having two and three cropper families, respectively. Each land situation was analyzed with different levels of family labor and additional capital. In addition to family labor, availability of seasonal hired labor was assumed for tobacco, cotton, and sweet potato production.

In some of the situations, it was assumed that additional cropland could be rented at $54.50 per acre. In computing this cost, a tobacco allotment cost of $250 per acre and an "other cropland" cost of $20 per acre were used. Fifteen per cent of each acre rented was assumed to carry a tobacco allotment, 10 per cent a cotton allotment, and the remaining 75 per cent was considered other cropland.

Enterprise budgets used in the study assumed a high level of technology for each crop and livestock enterprise considered in the analysis. Product prices and production costs were judgment estimates expected over the next several years.

Different combinations of land, labor, and additional capital were analyzed by linear programming techniques to determine most profitable farm organizations. Input and output prices were then varied for different combinations of land, labor, and capital, and new most profitable farm plans were obtained through price-mapping procedures.

Three major adjustment possibilities were considered for the single-unit (one-operator) farms. These were: (1) renting in additional cropland, (2) providing poultry or hog facilities, and (3) employing one member of the operator's family in off-farm work.

Renting additional cropland (including tobacco) resulted in large increases in farm income in situations with large amounts of labor and small amounts of land. Thus, farm income was increased greatly on the smaller farms when cropland was rented. Tobacco accounted for most of this increase in income when cropland was rented. On farms having large acreages of cropland, the increase in net revenue was much less when cropland was assumed available to rent. (In some cases, net revenue was not increased.) In cases where land was rented, a large percentage (50-65 per cent) of farm income was derived from tobacco.

In resource situations having large quantities of additional capital, capital was a good substitute for additional cropland. However, the average net return for additional capital used was low in most cases. This was especially true when additional cropland could be rented. In such cases, farm income was increased little by utilizing additional investment capital.

The labor for an off-farm job was subtracted from the family labor supply and the program was rerun. In this way, the value of this labor when used on the farm was determined. Subtracting the labor for an off-farm job decreased farm income very little on the smaller farms.

On the multiple-unit farms, with the initial levels of operator and cropper labor, net revenue was increased little by renting additional cropland or by providing additional capital. When the farms were considered as single units, i.e., when the farms were operated with unlimited quantities of hired labor instead of croppers, labor was less limiting and cropland was profitably rented. In these situations, income to the farm operator was increased over the situation where the farm was operated with sharecroppers.

The profitability of different crop and livestock enterprises varied on different size farms. Sweet potatoes, under the assumed prices and yields, were profitable in situations having small amounts of land and large amounts of labor. Cotton was profitable in similar resource situations. Flue-cured tobacco was profitable in all resource situations analyzed. Furthermore, tobacco production remained profitable over a wide range of prices and yields. However, the profitability of sweet potatoes, cotton, and tobacco was influenced greatly by the availability of seasonal hired labor.

Corn was profitable on larger farms and in other situations in which land could be rented. Layers and hogs were most profitable on farm situations restricted to small acreages of cropland and tobacco.

Economic Opportunities For Adjustments on Tobacco Farms in the Central Coastal Plain, North Carolina

PROBLEM AND OBJECTIVES

The Central Coastal Plain 1/ of North Carolina is important in the production of flue-cured tobacco. In 1959, farmers within these seven counties had about one-fourth of all flue-cured tobacco acreage in North Carolina. Within the area, tobacco accounted for two-thirds of all farm sales and three-fourths of all crop sales. Most of the remaining crop income was derived from sales of corn and cotton, while limited amounts of wheat, oats, soybeans, and sweet potatoes were also sold.2/

Livestock accounts for only a small part of total farm income in the Central Coastal Plain; in 1959, about 13 per cent of all farm income was from livestock.3/ Hogs accounted for more than one-half of the total sales of livestock products in the area. The remainder of the livestock income was from beef cattle, dairy cattle, broilers and layers.

Because of their reliance on flue-cured tobacco as a source of income, farmers in the Central Coastal Plain have been particularly affected by recent cuts in tobacco allotments, e.g., 29 per cent from 1955 to 1957.4/ Possibilities for greatly increasing farm incomes in the area by means of expanded tobacco allotments or higher

---

1/ See Figure 1.

2/ Unpublished estimates of county extension workers compiled by Extension Farm Management section, Department of Agricultural Economics, North Carolina State College, Raleigh.

3/ Ibid.

4/ Among these factors are increasing competition from foreign countries for our export markets, use of filter tips which replace tobacco and more complete utilization of the whole leaf by domestic manufacturers.

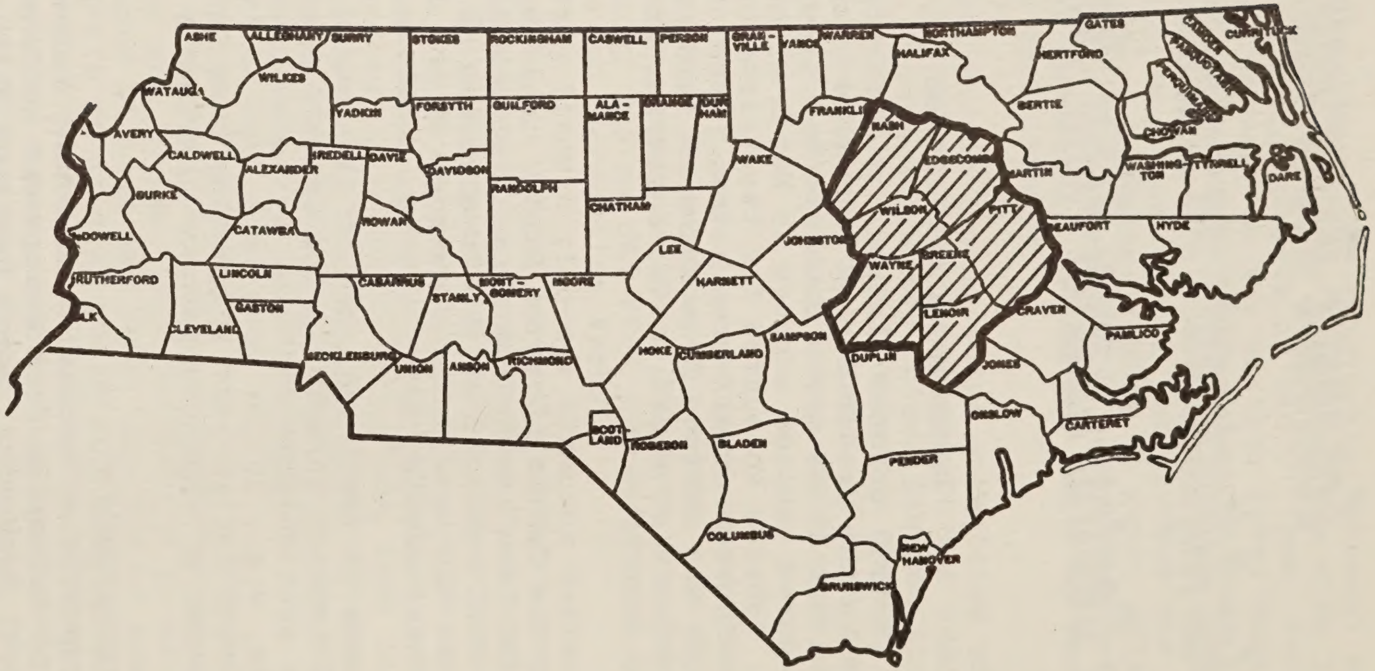

Figure 1. Central Coastal Plain, North Carolina

tobacco prices seem rather remote at the present time, and, as a consequence, farmers are looking for ways by which they may increase their incomes.1/ With this in mind, the objectives of this study are:

1. To determine the most profitable production and resource adjustments for typical resource situations in the Central Coastal Plain.

2. To determine the effects of rented land, hired labor, off-farm work, and additional investment capital on the most profitable farm organizations and their influence on net income.

3. To determine the effects of changes in prices, costs, and net revenue per enterprise on the most profitable farm organizations.

PROCEDURE

Linear programming procedures were used to determine the most profitable enterprise combinations for different resource situations that might be expected to exist on farms of the Central Coastal Plain.2/ Different farm plans were developed for both single-unit and multiple-unit farm situations, and the effects of changes in assumed price and cost data on farm organizations and incomes were examined by use of price-mapping procedures.

Enterprise Budgets

Farm planning requires estimates of the costs and returns for all crop and livestock enterprises to be

---

1/ A description of farm adjustments already made by 1958 can be found in: E. C. Pasour, Jr., W. D. Toussaint, and G. S. Tolley, "North Carolina Piedmont and Coastal Plain Tobacco Farms: Their Changing Characteristics, 1955-1958," Department of Agricultural Economics, A. E. Information Series No. 71, N. C. State College, Raleigh, Nov., 1959.

2/ Linear programming is a systematic method of budgeting. Anyone interested in the techniques can read one of many good sources, e.g., E. O. Heady and Wilfred Candler, Linear Programming Methods, Iowa State College Press, Ames, Iowa, 1958 or R. O. Ferguson and L. F. Sargent, Linear Programming: Fundamentals and Applications, McGraw Hill Book Co., Inc., 1958. An IBM 650 computer was used to perform the calculations for this study.

considered. In addition, the quantity of labor required for each crop and livestock enterprise must be estimated.

The budgets used in this study were worked out in cooperation with various production departments at North Carolina State College. The yields assumed in the enterprise budgets prepared for use in this study are thought to be consistent with the assumed level of technology. These yields probably are now being realized by the upper 10 per cent of farm operators in the Central Coastal Plain. A summary of the enterprise budgets prepared for use in this study is presented in Appendix Tables 1 and 2.[1]

Farmers were assumed to have a tractor, land preparation and seeding equipment, cultivating equipment, but no large harvesting equipment, such as a corn picker or grain combine. Harvesting operations were charged to each enterprise at a custom rate.

Input prices were based on a price survey of retail establishments located in the area. Product prices used are, for the most part, based on judgment and are prices expected to be realized for the next several years, assuming continuation of present governmental programs in agriculture. In the initial analysis, input and output prices were held constant. If prices should be different from those assumed in this study, the most profitable farm organizations might also be different. Hence, for a number of resource situations, selected input and output prices were varied, and new most profitable farm organizations were obtained through price-mapping procedures.

Resources per Unit of Net Return

In Table 1, crop and livestock enterprises common to the Central Coastal Plain are compared with respect to the quantity of land, labor, and investment capital required per unit of net return. The one-litter hog system requires more land, labor, and capital per unit of return relative to the other hog and poultry enterprises. Therefore, the one-litter system would never be as profitable as the other hog and poultry enterprises. Thus, it was dropped from further analysis. The crop enterprises were assumed to require no investment capital. That is, the farms in the area now have facilities for producing all crops considered

---

[1] A copy of each enterprise budget used in this study is on file in the Department of Agricultural Economics, North Carolina State College, Raleigh, North Carolina.

Table 1. Average land, labor, and additional investment capital required per $1,000 net return for crop and livestock enterprises considered in analysis

Enterprises	Resources required per $1000 net return								
	Land	Additional investment capital	Family labor						
			Dec.-Jan.	Feb.-Mar.	Apr.-May	June-July	Aug.-Sept.	Oct.-Nov.	Total
	(acres)	(dollars)	(hours)	(hours)	(hours)	(hours)	(hours)	(hours)	(hours)
Crop:									
Wheat	32.3	0	0	19.0	0	32.3	32.3	63.4	147.0
Corn	25.9	0	0	28.5	95.8	0	0	57.0	181.3
Soybeans	34.1	0	0	37.5	119.2	68.1	0	34.1	258.9
Cotton	6.0	0	3.6	10.1	61.3	72.0	262.5	259.0	668.5
Sweet potatoes	7.4	0	0	71.5	302.3	77.4	130.5	260.2	841.9
Flue-cured tobacco	1.5	0	8.2	19.4	37.7	170.6	240.9	48.3	525.1
Livestock:									
Layers	0	4029	107.7	102.6	105.6	105.6	105.6	105.6	632.7
Broilers	0	5054	94.8	90.4	93.2	93.2	93.2	93.2	558.0
Hogs, 8 sows, 2 litters on pasture	9.0	2616	79.6	92.7	86.0	86.0	90.2	81.8	516.3
Hogs, 8 sows, 2 litters on concrete	4.8	4192	68.2	73.9	70.2	72.2	73.4	69.0	426.9
Hogs, 8 sows, 1 litter on pasture	15.1	4361	215.4	122.2	117.4	73.0	78.4	105.6	712.0

in the analysis. However, this is not true for livestock. The production of broilers, layers, or hogs on most farms requires buildings and other specialized equipment; and capital must be invested if a farmer is to begin livestock production.

Net Income

Net return and net income are used interchangeably in this study. These terms, when pertaining to a specific crop or livestock enterprise, are taken to mean the total returns less cash costs. Cash costs include any overhead costs associated with the added investment required for a particular enterprise. In arriving at net income per farm, farm overhead costs were subtracted from the "total returns less cash costs" so that the figure presented as net income is the return to family labor and management.

Resource Restrictions

The most profitable farm plan for a large farm with one man available for labor may be quite an inefficient plan for a small farm with two man-equivalents for available labor. Each farm is a separate problem as far as planning is concerned. It was not possible to develop individual farm plans for each farm in the Central Coastal Plain. Instead, representative or typical farm situations were set up and plans developed for these situations. One of the best sources of data to determine existing farm resource situations is the records of county ASC offices. In this study, records of the ASC office in Wilson County were used as a basis for developing typical situations for the entire Central Coastal Plain. Wilson County is, in general, typical of the whole area, and the situations developed from these data are thought to be representative of many farms throughout the Central Coastal Plain.

Land

In determining typical farm acreages, Wilson County single- and multiple-unit operations were ranked on the basis of cropland per farm. The farms were then grouped according to cropland, and averages for each of these groups were computed for total land, cropland, tobacco allotment, and cotton allotment (see Appendix Tables 3 and 4). Three single-unit farms and two multiple-unit operations, in terms of acreage, were selected to typify farms within the Central Coastal Plain. The farm acreages, along with investment capital and allotment restrictions, selected for analysis are presented in Table 2.

Table 2. Land, farm value and investment capital restrictions for typical farm situations

Cropland	Total land	Cotton allotment	Tobacco allotment	Farm value	Levels of inv. cap.	
					1/4 farm value	1/2 farm value
(acres)	(acres)	(acres)	(acres)	(dollars)	(dollars)	(dollars)
Single units:						
15.5	34	1.9	2.6	13,600	3,400	6,800
29	59	3.0	4.3	23,600	5,900	11,800
52	97	4.2	7.5	38,800	9,700	19,400
Multiple units:						
75	142	6.3	10.8	56,800	14,200	28,400
121	238	9.6	17.2	95,200	23,800	47,600

In addition to the tobacco and cotton allotment restrictions shown in Table 2, wheat was restricted to 15 acres per farm. Use of tobacco skip rows [1/] was assumed, and 1.25 acres of cropland were assumed necessary for each acre of tobacco planted.

In some of the situations studied, it was assumed that additional cropland could be rented. Rented land was considered to be available at $54.50 per acre. In computing this cost, a tobacco allotment cost of $250 per acre and an "other cropland" cost of $20 per acre were used. Fifteen per cent of each acre rented was assumed to be tobacco allotment, and the remaining 85 per cent was considered other cropland. Cotton allotment, though entailing no additional rental charge, was limited to 10 per cent of land rented. The tobacco and cotton land in all instances was considered available for the production of other crops

---

[1/] A common practice is to skip every fifth, seventh, or ninth row to allow room for machinery. This study is based on the assumption that every fifth row is skipped.

North Carolina State Library
Raleigh

and livestock. From another study 1/ it was found that tobacco is seldom rented independently of other cropland in this area, and, conversely, that other cropland is seldom rented without tobacco. Hence, throughout the analysis when land was rented, tobacco and cotton were held at fixed proportions.

Investment Capital

Some farmers may be able to borrow or willing to borrow little or no additional investment capital; others may be able and willing to borrow large sums. The amount of investment capital available has definite effects on farm plans which can be followed. Thus, different levels of available investment capital were used with the different land and labor situations to determine the effects of this added capital. The levels of investment capital assumed available were based on the value of farm land and buildings. The average value of land and buildings was $307 per acre in 1954.2/ This figure was brought up to date by use of "Current Developments in the Farm Real Estate Market."3/ The average value of land and buildings was assumed to be $400 per acre for purposes of this study.4/ Estimated farm values (based on the value of land and buildings) for each farm situation studied are presented in Table 2.

In the analysis of typical farm situations, two different levels of capital were used for each land and labor situation. These levels were one-half and one-fourth of the estimated farm value. In addition, each land and labor situation was rerun with no investment capital, thus ruling out the possibility of livestock in those farm situations where no investment capital can be obtained, and livestock facilities are not already available.

1/ E. C. Pasour Jr., W. D. Toussaint, and G. S. Tolley, op. cit.

2/ Bureau of the Census, Census of Agriculture, 1954, Vol. I, Part 16 (Washington: Government Printing Office, 1956), p. 314.

3/ United States Department of Agriculture. Agricultural Research Service. Current Developments in the Farm Real Estate Market, various issues.

4/ The average value of land and buildings in Wilson County was $306.76 per acre in 1954 (census data). Farm real estate values have increased 27.8 per cent since that time (March 1959, Current Developments in the Farm Real Estate Market). Therefore, $306.76 x 127.8 = $392.04. This figure was increased to $400.00 per acre.

Operating capital was assumed to be available in unlimited quantities and was not a limiting resource.

Family Labor

Three levels of family labor were considered in investigating production and resource adjustment possibilities for alternative land and capital situations. These levels of operator family labor were one, one and one-half, and two man-equivalents of labor on the single-unit farms and one and one-half man-equivalents of labor on the multiple-unit farms. The method of computation for one man-equivalent of labor 1/ is presented in Table 3. Family labor was grouped by two-month periods for each operator labor level considered in the analysis. For all enterprises considered in this study, the operator was required to furnish 5 per cent of the family labor used. This was done to assure adequate supervision of family labor.

Hired Labor

Hired labor was considered available for some operations in tobacco production, for cotton picking, and for plant setting and harvesting of sweet potatoes. In one tobacco budget prepared for use in this study, the quantity of labor assumed hired for various operations in tobacco production was based on results obtained from a group of tobacco farmers in Wilson County. In this budget, 41 per cent (176 hours) of the total labor required per acre of tobacco (425 hours) was assumed hired. Of the labor hired, 85 per cent was hired during the harvesting, curing, and grading periods. The remainder of the labor hired was hired for transplanting, topping, and suckering. In another tobacco budget, 70 per cent (300 hours) of the total tobacco labor requirement was assumed hired. In this tobacco budget, most of the harvesting and all the grading and tying were assumed hired. The quantity of labor hired for transplanting, topping, and suckering was the same as in the other tobacco budget in which labor was hired. In all cases, however, the operator had the option of using family labor instead of hired labor where it was more profitable to do so.

1/ One man-equivalent of labor is taken to mean the labor of one man working full time on the farm. One and one-half man-equivalents of labor is a situation in which the operator's wife and perhaps a small child help with farm work. Two man-equivalents of labor would be a labor situation in which there are either two male adults or one male adult, his wife, and two children more than 14 years of age.

Table 3. One man-equivalent of labor converted to an hourly basis

Month	Number of week days	Hours per day	Weekday hours	Week end hours a/	One man-equivalent total hours
	(days)	(hours)	(hours)	(hours)	(hours)
January	22	8	176	18	194
February	20	8	160	16	176
March	22	8	176	18	194
April	21	8	168	18	186
May	22	9	198	18	216
June	21	9	189	18	207
July	22	9	198	18	216
August	22	9	198	18	216
September	21	9	189	18	207
October	22	8	176	18	194
November	21	8	168	18	186
December	22	8	176	18	194
Total	258		2172	214	2386

a/ Based on two hours per week end day.

In the analysis of resource situations, the operator was required to provide one hour of supervisory labor for each 20 hours of labor hired. Thus, even though labor could be hired in unlimited quantities, the amount of hired labor was restricted by the assumption that hiring labor required supervision. A wage rate, varying by operation, which averaged about $.75 per hour was used in the initial analysis. The cost of labor was then varied in selected situations to determine the effects of wage rates on most profitable enterprise combinations and net returns per farm.

Cropper Labor

Two cropper units were assumed for the 75-acre farm and three cropper units for the 121-acre farm. Labor availability per cropper family was based on a previous study 1/ and is presented in Appendix Table 5. As was

---

1/ E. C. Pasour, Jr., W. W. McPherson, and W. D. Toussaint, "Economic Opportunities for Adjustment on Tobacco Farms in the Northern Piedmont, North Carolina," Department of Agricultural Economics A. E. Information Series No. 70, N. C. State College, Raleigh, Aug., 1959.

the case with hired labor, it was assumed that the operator was required to provide one hour of supervisory labor for each 20 hours of cropper labor used. Croppers were permitted to produce tobacco, cotton, and corn as cropper family labor permitted. It was assumed that the sharecroppers could trade labor with other cropper families but could not hire additional labor.

A common problem for multiple-unit operators is whether they should farm with croppers or hired labor. For this reason, the effects of the usual type arrangement on multiple-unit operations where the operator and croppers produce crops separately were compared with the effects of a situation in which the operator substituted hired labor for cropper family labor.

Off-Farm Work

Each single-unit land and capital resource situation was analyzed initially with one, one and one-half, and two man-equivalents of labor. After this was done, one man-equivalent of labor was subtracted from the two largest labor situations, and the programs were rerun. In this way, the value of one man's labor to the farm was determined for different land, labor, and capital situations.

ADJUSTMENT OPPORTUNITIES

In this section, off-farm work, additional investment capital, and renting cropland are discussed as potential ways of increasing farm incomes on single-unit tobacco farms in the Central Coastal Plain. For multiple-unit operations, a comparison of the net returns when operating with sharecroppers versus hired labor is made. Only the most profitable farm organizations for a few resource situations will be presented in this section. However, a number of other farm plans will be discussed, and other results are presented in the Appendix.

Single Units

Off-Farm Work

Possibilities for increasing incomes to farm families through nonfarm employment are usually much greater on farms with high ratios of family labor to land and capital. In Table 4, the most profitable farm organization is presented for the 15.5-acre farm under conditions with and without off-farm employment. In these situations, no additional capital

Table 4. Most profitable farm organization, 15.5-acre farm, 1.5 units family labor with and without off-farm job, no additional capital, no land rented

Item in specified units		Most profitable farm organization	
		No off-farm work	With off-farm work
Tobacco	(acres)	2.6	2.6
Cotton	(acres)	---	1.9
Sweet potatoes	(acres)	12.2	7.8
Corn	(acres)	---	2.6
Labor hired	(hours)	95	1,100
Total returns less cash costs	(dollars)	3,705	2,815
Farm overhead costs	(dollars)	905	905
Net income	(dollars)	2,800	1,910

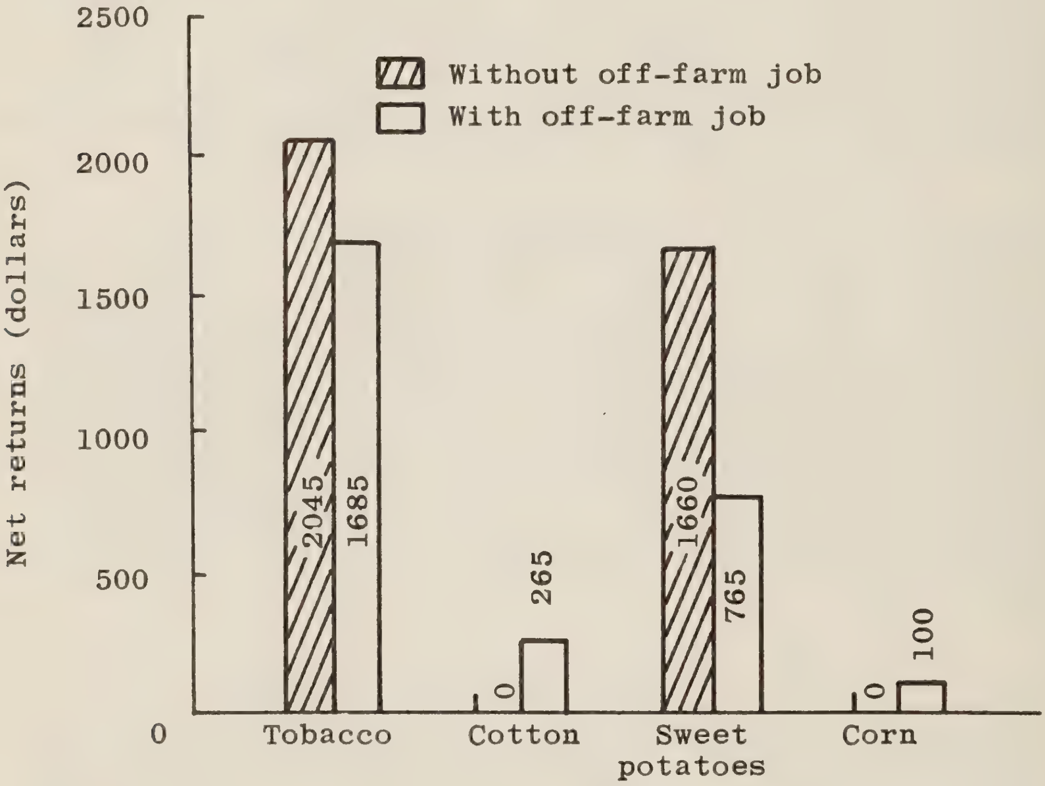

Figure 2. Net returns by enterprise for most profitable farm organization of Table 4

was available and no land was considered available to rent. The operator's family labor supply is comprised of 1.5 man-equivalents (hereafter referred to as units) of labor. The solution was first obtained under the assumption that all family labor was available for farm work. Then, the labor for one full-time, off-farm job was deducted from the family labor supply, and the program was rerun.

With all family labor employed in farm work, tobacco and sweet potatoes comprised the most profitable farm organization (Table 4). The ratio of labor to land was so high that only crops requiring small amounts of land and large amounts of labor per unit of return were included in the most profitable farm organization. With the high ratio of family labor to land, only 95 hours of seasonal labor were hired in tobacco production. The net income for this farm organization was $2,800.

When the labor for one member of the operator's family was subtracted from the family labor supply,1/ crops which required less labor and more land per unit of return, i.e., corn and cotton, were substituted for sweet potatoes (Table 4). More seasonal labor was hired in the production of tobacco, cotton, and sweet potatoes. The net income for this farm plan was $1,910. That is, when one man's labor was deducted (for an off-farm job) from the family labor supply, net income was decreased $890. This figure is a measure of the value of a family worker when employed in farm work on a farm having resources comparable to those of the 15.5-acre farm studied. Thus, if nonfarm employment were available paying more than $.42 per hour (or $16.80 per week), one man's labor might be more profitably employed in off-farm work.2/ It is apparent that, on farms characterized by high ratios of labor to other productive resources, off-farm work may be a means of increasing family income.

The results presented in Table 4 were obtained under the assumption that seasonal labor could be hired in the production of cotton, tobacco, and sweet potatoes. If additional labor could not be hired, family labor would be more limiting, and the value of the family labor in farm work would be greater than indicated above.

The farm organizations presented in Table 4 are for resource situations in which farm size was limited to 15.5 acres. No additional land could be rented; livestock facilities were not available, and additional capital

---

1/ At 40 hours per week.

2/ Based on 40 hours per week and 50 weeks per year.

was not available to provide such facilities. When available farm resources were increased, off-farm work appeared less attractive as a means of increasing income to farm families. Possibilities, considered in this study, to utilize more profitably any level of family labor in farm work included: (1) renting additional land, (2) increasing the acreage of cropland owned, and (3) providing additional investment capital.

When additional cropland was assumed available for renting on the 15.5-acre farm, farm size (rented and owned) increased to 58.3 acres cropland. This assumed the entire family labor supply, 1.5 units, was employed on the farm. If one member of the operator's family were employed in nonfarm work, much less land was profitably rented, and the most profitable farm size was reduced to 26.8 acres. A comparison of the net income for these two farm plans shows a decrease of $2,220 in the situation having an off-farm job. Thus, the nonfarm work must pay more than $1.11 per hour in order for this worker to be more profitably employed in nonfarm work.1/ Thus, for a situation in which effective farm size can be increased by renting in land, off-farm work appears much less profitable as a possible alternative for family labor.

Similar results were obtained when cropland owned was increased. On the 52-acre farm, when the family labor supply was adjusted for an off-farm job, net income was reduced $2,915 over a comparable resource situation in which all family labor was used for farm work. For nonfarm employment to be profitable for a member of the operator's family in this situation, a wage rate of more than $1.46 per hour was required.

Another means often available to increase incomes on small farms is to use additional investment capital. With family labor constant (1.5 units), investment capital was added to the resources of the 15.5-acre farm (land not available to rent). When $6,800 additional capital was available, 2,000 layers were added; and cropland was utilized for tobacco, cotton, and sweet potatoes. After deducting the labor for an off-farm job, hogs and corn substituted for layers and sweet potatoes, while tobacco and cotton acreage remained about the same. Hogs and corn required more land but less labor per unit of net return relative to layers and sweet potatoes. Net income was

---

1/ It should be recognized that, when the manager takes an off-farm job, crop and livestock production also may become less efficient because of inadequate supervision.

$1,385 lower in the situation with one family member engaged in nonfarm work. In this case, unless nonfarm employment were available paying more than $.69 per hour, all family labor would be more profitably employed in farm work.

In the foregoing illustrations, the level of family labor was assumed to be 1.5 man-equivalents. For any given level of land and/or capital, off-farm employment for family labor was a more profitable alternative when there was an increase in the family labor supply. For example, with two units of available family labor on the 15.5-acre farm, the ratio of labor to land was so high that an off-farm job decreased net income only $425 annually, compared to $840 when 1.5 units of family labor were available.

Additional Investment Capital

Each land and labor situation was analyzed with two levels of additional investment capital. The levels were one-fourth and one-half the estimated value of the farm land and buildings. In addition, each land and labor situation was analyzed with no added capital, which ruled out all livestock enterprises.

Changes in the most profitable farm organization when capital was added to the resources of the 29-acre farm are shown in Table 5. Without capital, the most profitable combination of enterprises consisted of tobacco, cotton, and sweet potatoes. These are crops requiring small amounts of land but large amounts of labor per unit of return. Almost 1,900 hours of seasonal labor were hired in the production of tobacco and sweet potatoes. The net income in this situation was $3,955, and income from tobacco accounted for slightly more than one-half of net farm income.

The farm plan presented in Table 5, Column 2, is one in which $11,800 was added to the resources of the 29-acre farm. With the addition of capital, a 3,425 layer enterprise was added. In addition, 16.5 acres of corn were added, and sweet potato acreage was decreased by the same amount. The addition of layers in the most profitable farm organization resulted in family labor being utilized more fully. Sweet potatoes require large amounts of seasonal labor. Consequently, as layers and corn were added at the expense of sweet potatoes, a smaller quantity of labor was hired. Net income increased from $3,955 to $5,620

Table 5. Most profitable farm organization, 29.0-acre farm, 1.5 units family labor, with and without additional capital, no land rented

Item in specified units		Most profitable farm organization	
		No additional capital	$11,800 additional capital
Tobacco	(acres)	4.3	4.3
Cotton	(acres)	3.0	3.0
Corn	(acres)	---	16.5
Sweet potatoes	(acres)	20.6	4.1
Layers	(number)	---	3,425
Labor hired	(hours)	1,885	1,475
Total returns less cash costs	(dollars)	5,465	7,130
Farm overhead costs	(dollars)	1,510	1,510 a/
Net income	(dollars)	3,955	5,620

a/ Farm overhead costs remain the same since a capital charge was included in each layer and hog enterprise budget.

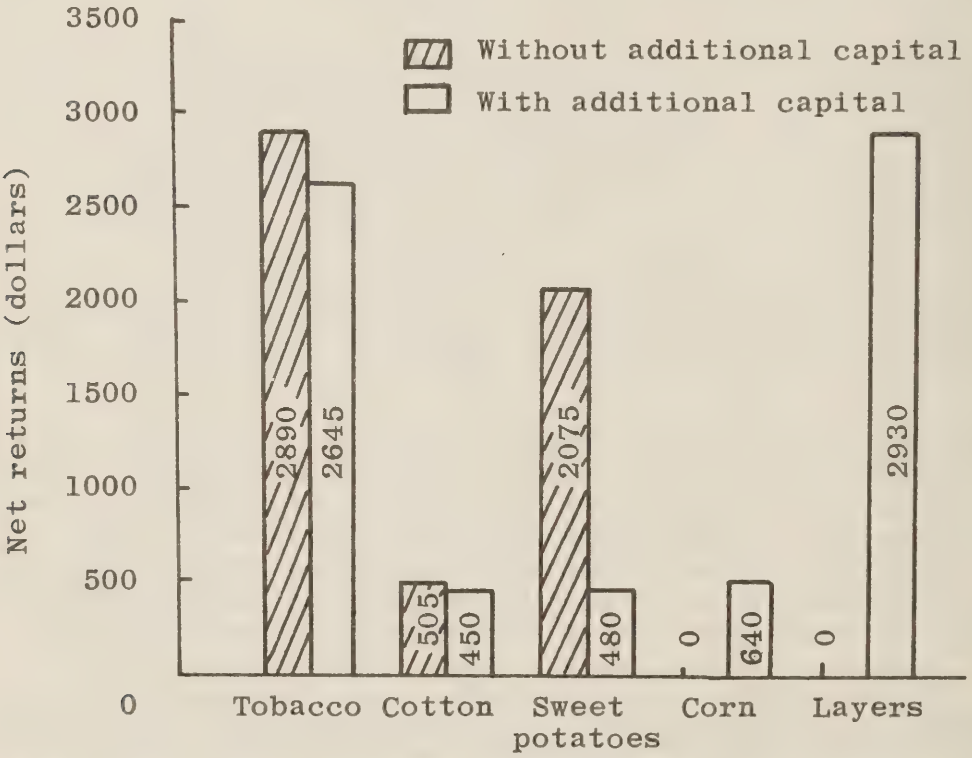

Figure 3. Net returns by enterprise for most profitable farm organizations of Table 5

for an average net return of $.14 on the additional capital invested.1/

As budgeted in this study, layers and hogs were fairly close substitutes. Layers required less land, more labor, and more capital per unit of return when compared with hogs. Layers were among the most profitable alternatives on the smaller farms when cropland could not be increased by renting additional land. On the larger farms and when farm size was increased by renting land, hogs were included. Relatively small changes in the prices or net returns of layers and/or hogs caused a substitution of one for the other in the most profitable farm organization. For example, a 46-sow swine enterprise was in the most profitable farm organization on the 52-acre farm where no land was rented and 1.5 units of family labor and $19,400 available investment capital were available. With hog prices reduced from $16.00 to $15.50 per hundred pounds, hogs were eliminated from the most profitable farm organization; cropland was released because hogs were excluded, and tobacco, cotton, and corn acreage were increased. More seasonal labor was hired in tobacco production, and net income was decreased $450 with the substitution of layers for hogs.

On the 29-acre farm with 1.5 units of family labor and no cropland available to rent, 3,425 layers (eggs at .33 per dozen) were included in the most profitable farm organization when $11,800 additional capital was available. With eggs priced at or below $.315 per dozen, hogs replaced layers in the most profitable farm organization. Hogs required land for pasture, and, when hogs were substituted for layers, sweet potato acreage decreased. Net income was decreased $290 by these changes.

The income effects of adding livestock facilities were more dramatic on farms having small acreages of cropland and a large supply of family labor (such as the example in Table 5). If the acreage of cropland for any given level of family labor was increased, either through renting or buying land, the income effect of adding a poultry or hog enterprise was much less. Conversely, if the level of family labor were increased for any acreage of cropland, the potential value of added capital increased.

The 29-acre farm with 1.5 units of labor provides an illustration of the manner in which renting land decreased

---

1/ The figure presented represents a net return since a charge for capital (at 6 per cent) was included in each livestock budget.

the value of additional capital.1/ When $11,800 investment capital was available with no cropland rented, net income was increased $1,665 over a comparable situation in which no capital was available. This was an average net return on added capital of 14.0 per cent. With farm size increased by renting in 31.8 acres of cropland, the addition of $11,800 investment capital increased net income by only $585 for an average net return of 4.9 per cent on the additional capital invested.

In all resource situations with the addition of investment capital, either hogs or layers were added to the enterprises comprising the most profitable farm plan. At the same time, there was a decrease in sweet potatoes (and in some cases cotton), while corn acreage increased. In most cases, the acreage of tobacco remained unchanged when poultry or hogs were added, but more labor was hired in tobacco production.

However, on the 52-acre farm with 1.5 units of labor and no rented land and when the upper level of capital was available, tobacco was underplanted by 2.7 acres.

Renting Additional Cropland

One possibility for utilizing family labor more fully and profitably is to increase farm size by renting in cropland. For all cropland rented, 15 and 10 per cent were assumed to be available for tobacco and cotton, respectively. The assumed rent for cropland was $54.50 per acre.

The farm organizations presented in Table 6 are for the 29-acre farm with 1.5 units of family labor and no additional capital. When no cropland was rented, tobacco, cotton, and sweet potatoes comprised the most profitable enterprise combination. Both tobacco and cotton were at their allotted acreage. Almost 1,900 hours of seasonal labor were hired, and net income was $3,955.

When cropland was assumed available to rent, 31.8 acres were rented. Total tobacco acreage more than doubled, as 4.8 acres of tobacco (15 per cent of 31.8) were produced on rented land. As tobacco acreage increased, more seasonal labor was hired, enabling the operator's family to tend

---

1/ A more detailed explanation of changes in farm organization as a result of renting in cropland are presented in the following section.

Table 6. Most profitable farm organization, 29.0-acre farm, 1.5 units family labor, no additional capital, with and without rented land

Item in specified units		Most profitable farm organization	
		No cropland rented	Cropland rented
Tobacco	(acres)	4.3	9.1
Cotton	(acres)	3.0	4.8
Corn	(acres)	---	39.1
Sweet potatoes	(acres)	20.6	5.6
Land rented in	(acres)	---	31.8
Labor hired	(hours)	1,885	2,720
Total returns less cash costs	(dollars)	5,465	6,915
Farm overhead costs	(dollars)	1,510	1,510
Net income	(dollars)	3,955	5,405

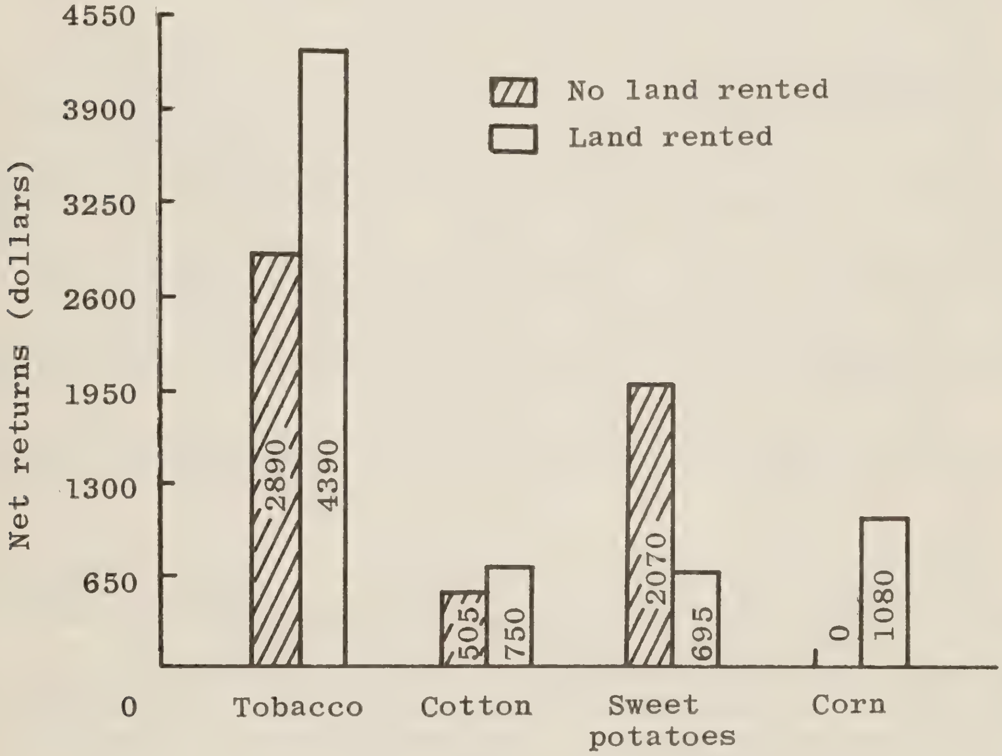

Figure 4. Net return by enterprise for most profitable farm organizations of Table 6

the increased tobacco acreage. As tobacco acreage was increased, cotton was increased slightly, sweet potatoes were decreased, and a large acreage of corn was added. That is, as additional land was rented, the major change in the most profitable farm plan, other than the increase in tobacco acreage, was that corn, a crop requiring relatively more land and less labor per unit of return than sweet potatoes, was substituted for sweet potatoes. Net income increased from $3,955 to $5,405 when farm size was increased by renting cropland.1/ In either case, income from tobacco comprised more than one-half of total net farm income.

When additional capital was not available, flue-cured tobacco comprised from one-half to two-thirds of net farm income in the most profitable enterprise combinations for the various labor situations on each size farm. This was true when additional cropland was rented. Increasing the acreage of land rented in did not affect the percentage of income derived from tobacco in a given situation since a constant proportion (15 per cent) of land rented was tobacco allotment, and planting the full allotment of tobacco was always profitable (when land was rented in).

The information presented in Table 6 is for a farm small in terms of cropland with no available capital. With $11,800 available capital on the 29-acre farm, a 28-sow swine enterprise was added to the most profitable farm plan. A smaller acreage of land was profitably rented relative to a comparable resource situation with no available investment capital (11.6 vs. 31.8). As the acreage of rented land decreased, tobacco acreage decreased from 9.1 to 6.0 acres, cotton and sweet potatoes decreased slightly and there was a large decrease in corn acreage. Net income increased $585 over the situation with no available capital.

Renting cropland had a much greater effect on farm income in resource situations having a high ratio of labor to land and capital. The increase in net income on the

---

1/ Another factor to be considered in renting additional cropland is that increases in cost of equipment and tools may be required to handle the additional land. That is, when additional land is rented, the equipment owned (tractors, plows, etc.) may be too small, or additional items of equipment may have to be bought. The increase in net farm income from renting cropland will be less than the amount indicated in this report in cases where the farm operator has to rent or buy additional equipment in order to tend the acreage owned and rented.

15.5-acre farm when cropland was rented illustrates the large increase in income from renting land on small farms. With 1.5 units of family labor, 42.8 acres cropland were profitably rented, increasing total acreage tended to 58.3 acres. When cropland was rented, net income increased from $2,800 to $5,300. For resource situations having more owned land, smaller acreages of cropland were profitably rented, but the optimum farm size, with no additional capital and 1.5 units of family labor, was about 60 acres, regardless of the original farm size. However, changes in the supply of family labor affected the optimum farm size. When family labor was increased to two units with no additional capital, optimum farm acreage was approximately 80 acres on each size farm. When investment capital was available, smaller acreages of cropland were profitably rented, thus decreasing the optimum farm acreage.

The value of additional land to any farm unit depends, to a large extent, on the relative amounts of land and labor available on the farm. Linear programming procedures provide one measure of the worth of additional land to farms. From these procedures, values of marginal product 1/ are determined which show how much net income would increase if one more unit of a resource were used. This value of marginal product, then, is an indication of the maximum amount that could be paid for the use of one more unit of a resource without decreasing net income. Therefore, if additional land can be rented for less than the value of marginal product for land, it would be profitable to do so.

The values of the marginal product for cropland and tobacco allotment were highest for resource situations having a high ratio of labor to land and capital. For example, with 1.5 units of family labor and no additional investment capital, the potential value of another acre of cropland on the 15.5-acre farm was $135 (15 per cent of this land is tobacco allotment). The value of another acre of tobacco allotment on this farm was $568.

As farm acreage increased with family labor constant, the potential values of additional cropland and tobacco allotment decreased. For example, on the 52-acre farm,

---

1/ The value of the marginal product is applicable to any limiting resource. However, only those values pertaining to land are discussed. The values of the marginal product for cropland, tobacco allotment, cotton allotment, family labor, and additional investment capital for a large number of results are presented in the Appendix.

the values of the marginal product were $98 for cropland and $495 for tobacco allotment with 1.5 units of family labor (no rented land and no added capital). Since the rent assumed for cropland was $54.50 per acre, it can be seen that the renting of additional land would be profitable on all but very large farms. This, of course, is borne out in the income differences of situations with and without renting land.

Multiple Units

A multiple-unit farm is one tended by an operator and one or more sharecropper families. Or, if the operator does not farm, it is one in which there are two or more sharecropper families. These farms are presently of considerable importance in the Central Coastal Plain. For example, 40 per cent of the farms in Wilson County were multiple-unit operations in 1959, and 65.8 per cent of the cropland was on multiple-unit farms.1/ Two multiple-unit resource situations having 75 and 121 acres of cropland were selected to represent the multiple units of the Central Coastal Plain. These farms were assumed to have two and three sharecropper families, respectively. Assumptions similar to those of the single units were made for the multiple-unit farms regarding the hiring of seasonal labor by the operator in tobacco, cotton, and sweet potato production. However, sharecroppers were assumed to hire no labor, and their farming alternatives were restricted to tobacco, corn, and cotton, since, in many cases, sharecroppers do not have the opportunity or ability to hire and properly supervise additional labor.

Without Rented Land

The most profitable farm plans presented in Table 7 are for the 75- and 121-acre farms when available cropland was limited to owned land. The farm organization presented in columns 1 and 3 is for the 75-acre farm under the usual type multiple-unit organization in which the operator and the sharecroppers tend separate enterprises. Tobacco and cotton enter the most profitable combination of enterprises at their restricting allotments, with roughly half the tobacco and cotton acreage tended by the croppers. The operator must hire more than 1,750 hours of seasonal labor in tobacco production. His net income was $5,390. Net income per cropper family was slightly more than $1,100.

1/ ASC data. See Appendix Tables 3 and 4.

Table 7. Most profitable farm organizations, 75- and 121-acre farms, two and three cropper families, respectively, operator's labor, no additional capital, no land rented

Item in specified units		Farms operated as multiple units				Farms operated as single units	
		Operator's family		Croppers			
		75-acre	121-acre	75-acre	121-acre	75-acre	121-acre
Tobacco	(acres)	5.9	5.5	4.9	11.7	10.8	17.2
Cotton	(acres)	3.1	1.1	3.2	0	6.3	9.6
Corn	(acres)	54.1	71.2	0	12.3	43.9	75.5
Sweet potatoes	(acres)	1.1	0	0	0	4.5	0
Wheat	(acres)	0	15.0	0	0	6.8	15.0
Labor hired	(hours)	1,760	1,527	0	0	4,405	7,253
Total returns less cash costs	(dollars)	8,655	11,825	2,245	4,980	9,370	14,060
Farm overhead costs	(dollars)	3,265	4,745	--	--	3,265	4,745
Net income	(dollars)	5,390	7,080	2,245	4,980	6,105	9,315

In column 5 of Table 7, the most profitable farm plan is presented for a similar resource situation, but with the farm operated as a single unit, that is with hired labor instead of cropper labor supplementing the operator's labor supply. It was assumed that tobacco and cotton were the only crops that could be produced utilizing hired labor exclusively. When compared with the farm organization for the situation having separate cropper and operator enterprises, tobacco and cotton acreage were unchanged, corn acreage decreased slightly, sweet potatoes increased, and wheat was added. More than 4,400 hours of seasonal labor were hired in tobacco, cotton and sweet potato production. Net income to the farm operator was $715 larger than in the previous illustration where the farm was operated as a multiple unit.

When the 75-acre, multiple-unit farm was operated with $14,200 available capital, $10,200 additional capital was used to add a 24-sow enterprise (the remainder of the capital was not used). Tobacco, cotton, and corn acreage tended by the operator decreased; sweet potatoes were eliminated, and wheat was added. Labor hired was reduced by half. At the same time, tobacco tended by the croppers increased by 2.9 acres, while no cotton was produced. When compared to a similar situation without capital, net income to the operator was increased $795, while income per cropper family was increased $460.

When the farm was operated as a single unit (substituting hired labor for cropper labor), the availability of $14,200 investment capital resulted in the addition of a 35-sow enterprise. When compared to the comparable resource situation with no capital, tobacco and cotton acreage were unchanged; corn acreage was decreased; sweet potatoes were eliminated, and wheat acreage remained about the same. Slightly more labor was hired in tobacco and cotton production. Net income was increased $1,975 for an average net return on added investment of 13.8 per cent.

On the 121-acre farm (family labor constant but with three cropper families), the ratio of labor, both operator and cropper, to land was lower than was true on the 75-acre farm. Thus, when operated with no additional capital as a multiple unit, the operator on the 121-acre farm, when contrasted with the 75-acre farm, produced less tobacco and cotton, no sweet potatoes, more corn, and added wheat (see Table 7). Slightly less labor was hired, and net income for the operator's family increased from $5,390 to $7,080. At the same time, tobacco acreage tended by the sharecroppers increased from 4.9 to 11.7 acres; cotton was eliminated, and 12.3 acres of corn were tended by the croppers. Income per cropper family was $1,120 compared to $1,660 on the smaller multiple unit. When the 121-acre farm was programmed as a single unit, 7,250 hours labor were hired, and net income to the operator increased $2,235 relative to the multiple-unit situation for the same farm.

With Rented Land

The most profitable farm plans for the 75- and 121-acre farms under both multiple- and single-unit arrangements are presented in Table 8. When the 121-acre farm was operated as a multiple unit, the ratio of land to labor was so high that no cropland was profitably rented at $54.50 per acre. The farm net income to the operator in this case was $7,080, and the net return per cropper family was $1,660. On the 75-acre farm, the ratio of labor to land was higher, and 13.7 acres cropland were profitably rented, with the croppers tending the added tobacco. When land was rented on the small farm, cropper income increased from $1,120 to $1,570 per family.

When the 121-acre farm was reprogrammed as a single-unit operation (substituting hired for cropper labor), there was a marked change in farm organization. Cropland totalling 131 acres was rented, and tobacco acreage increased to 36.9 acres. More than 17,500 hours of hired labor were required in the production of tobacco and cotton. Although 131 acres of cropland were rented, in addition to the 121 acres owned, only 175 acres were tended, leaving 77 acres not being used. Thus, land was being rented for the tobacco. The farm organization on the 75-acre farm was almost identical to that of the 121-acre farm when cropland was assumed available to be rented. More cropland was rented (172.8 vs. 131.0), but the total acreage cropped was about the same in each case, i.e., 175 acres. In addition, similar quantities of the same enterprises comprised the most profitable farm organization on both the 75- and 121-acre farms.

When investment capital was assumed available on the 121-acre multiple unit, no additional capital was profitably used, whether the farm was operated as a single or multiple unit. Similarly, additional capital had no potential value on the 75-acre farm when it was operated as a single unit. With the large acreages of owned and rented land, family labor was more profitably utilized in crop production. With capital available on the 75-acre farm, a 24-sow enterprise entered the most profitable enterprise combination with the farm operated as a multiple unit. In this situation, no cropland was profitably rented, and labor hired decreased by one-half. Net income to the operator's family increased only $350 over a similar resource situation in which it was

Table 8. Most profitable farm organizations, 75- and 121-acre farms, two and three cropper families, respectively, rented land available, no additional capital

Item in specified units		Farms operated as multiple units				Farms operated as single units	
		Operator's family		Croppers			
		75-acre	121-acre	75-acre	121-acre	75-acre	121-acre
Tobacco	(acres)	5.9	5.5	7.0	11.7	36.7	36.9
Cotton	(acres)	3.1	1.1	3.7	0	23.6	22.8
Corn	(acres)	65.8	71.2	0	12.3	91.0	90.8
Wheat	(acres)	0	15.0	0	0	15.0	15.0
Land rented in	(acres)	13.7	0	0	0	172.8	131.0
Total land used (rented and owned)	(acres)	76.3	94.1	12.4	26.9	175	175
Labor hired	(hours)	1,734	1,525	0	0	17,600	17,555
Total returns less cash costs	(dollars)	9,080	11,825	3,140	4,980	16,405	18,685
Farm overhead costs	(dollars)	3,265	4,745	--	--	3,265	4,745
Net income	(dollars)	5,815	7,080	3,140	4,980	13,140	13,940

assumed that rented land and no capital were available. At the same time, cropper income remained about the same. For all resource situations on these farms in which land was available to rent, net income per cropper family was roughly $1,600.

EFFECTS OF CHANGES IN SELECTED PRODUCT PRICES AND RESOURCE COSTS ON MOST PROFITABLE ENTERPRISE COMBINATIONS

The most profitable enterprise combinations for all single-unit and multiple-unit situations analyzed (as presented in the two preceding sections) were determined with given product prices and resource costs. Had other assumptions regarding prices, costs, and net returns per units of the enterprises been made, different optimum farm plans might have resulted. It is of interest to know how stable the optimum farm plans of the preceding sections are in terms of how big a range of prices would give the same optimum farm plans as for the original set of assumed prices. Then, too, it is useful to know what changes in optimum farm plans would occur as other price and cost assumptions are made. Selected product prices and resource costs were varied to determine how these changes affect the most profitable farm organization. The results of this analysis are shown in this section on charts referred to as price maps.1/ In the price-mapping analysis, it is assumed that all prices and costs, other than the two factors being varied in each price map, are held constant.

Changes in Prices of Cotton and Sweet Potatoes

Cotton and sweet potatoes require smaller amounts of land per unit of net return than any crop enterprises other than tobacco considered in this study. Consequently, cotton and sweet potatoes are expected to be most profitable in resource situations having high ratios of labor to land and capital. For this reason, the 15.5-acre farm, the

---

1/ All "price maps" presented in this section have been adjusted to reduce the number of areas. Areas were eliminated in cases where only small differences in net return occurred when the enterprise combination of one area was used with the prices of another area. However, no attempt was made to adjust the most profitable enterprise combinations to eliminate extremely small units of the enterprises in the optimum plans. As a result, some of the enterprise combinations shown on the price maps are not completely practical.

smallest farm considered in the analysis, was selected to study the effects on most profitable farm organization of varying cotton and sweet potato prices.

At the present time, sweet potatoes are being produced in limited quantities in the Central Coastal Plain. Since sweet potatoes, under the assumptions of this study, appear to be a profitable alternative on small farms, information was desired concerning the relative profitability of sweet potatoes over a range of prices.

Large acreages of cotton have historically been grown in the Coastal Plain. Under a new provision of the cotton program permitting the transferring of cotton allotments, larger cotton allotments are now available to many farmers in the area. Thus, in the situation selected for further analysis by price-mapping techniques, the cotton allotment restriction was lifted. Land was assumed available to rent in at $54.50 per acre. Family labor was restricted to that of the operator, but some seasonal labor was hired where profitable.

The most profitable enterprise combinations as cotton and sweet potato prices are varied are presented in Figure 5. The most profitable farm organization of Section A (see Figure 5) was determined by the programming procedures previously described. This solution was established with cotton at $.32 per pound and sweet potatoes at $1.85 per bushel. At these prices and yields, the net returns per acre from cotton and sweet potatoes are $168 and $136, respectively. Equivalent net returns per acre may be attained if prices are lowered and yields increased, or vice versa. For example, the net return per acre for cotton remains $168 if price is lowered to $.30 per pound and yield is increased to 665 pounds. Conversely, if sweet potato prices increase to $2.25 per bushel, a yield of 140 bushels gives a net return of $136 per acre. Section A of the price map shows the range in prices of sweet potatoes and cotton within which the enterprise combination presented in that area would be most profitable. If sweet potato prices fall below $1.82 per bushel, with cotton at $.32 per pound, sweet potatoes are eliminated from the most profitable enterprise combination (see section G, Figure 5), and there is an increase in cotton, tobacco, and corn acreage. As sweet potato prices decrease, more land is profitably rented in, and tobacco acreage increases (15 per cent of land rented in is assumed to be available for tobacco production). With sweet potatoes at $1.85 per bushel, cotton must fall below $.269 per pound to be eliminated from among the most profitable alternatives.

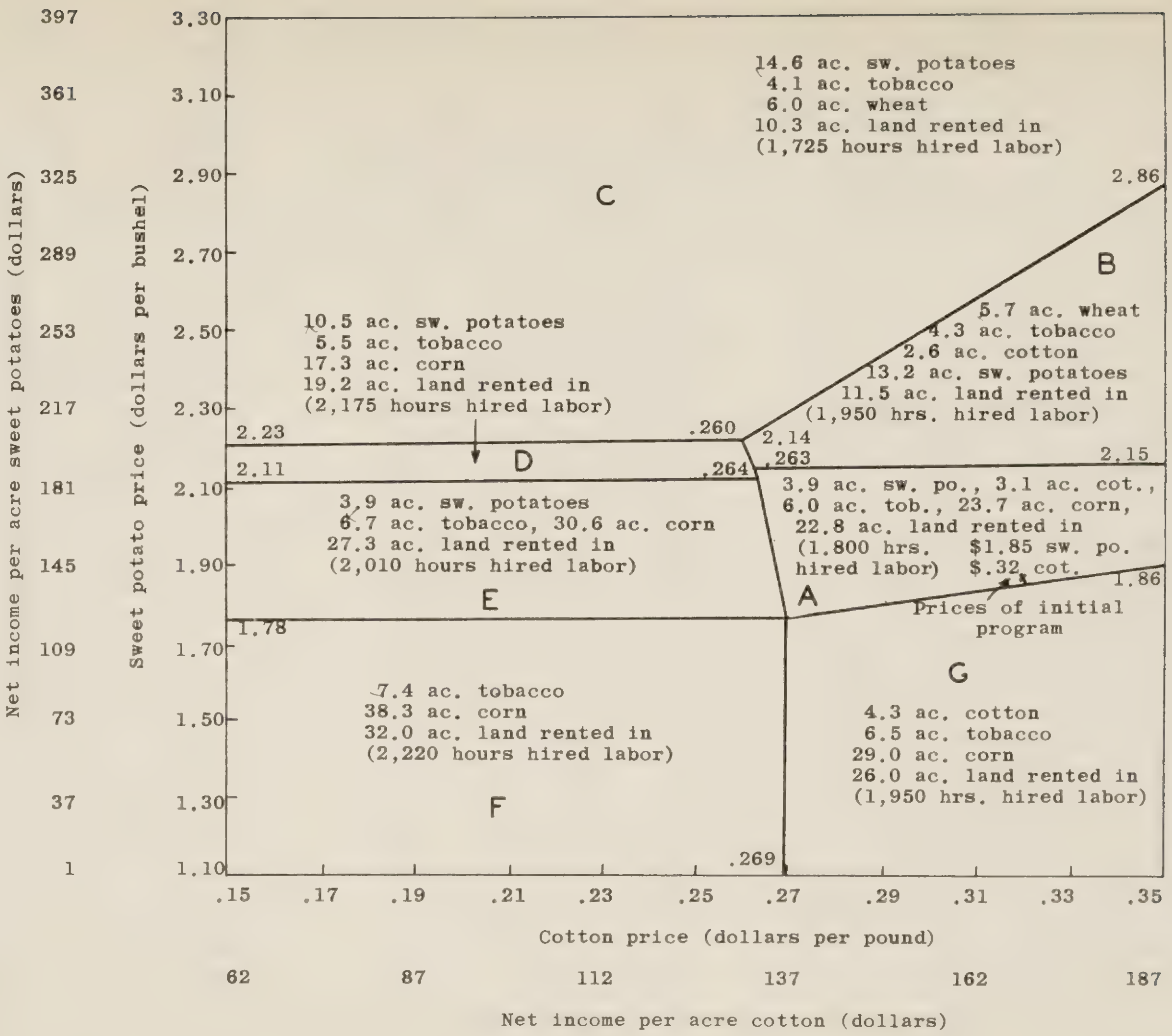

Figure 5. Most profitable enterprise combinations when prices of cotton and sweet potatoes vary; farm with 15.5 acres cropland owned, 2.6 acres flue-cured allotment, no additional investment capital, ooperator's labor, some seasonal labor hired, cropland rented in

The farm organization shown in section G is the most profitable for cotton prices above $.269 when sweet potato prices are below $1.78 per bushel. However, with cotton prices below $.269 per pound, cotton production is no longer among the most profitable alternatives. In the enterprise combination of section F, both cotton and sweet potatoes are eliminated; more cropland is profitably rented; more tobacco is produced, and corn acreage is increased.

It should be pointed out that both cotton and sweet potatoes are eliminated from among the most profitable alternatives at a fairly high price, This is due to the assumption of allowing land to be rented in. Tobacco is such a profitable crop that, with land rented in, tobacco acreage is increased as prices of sweet potatoes and cotton are lowered. Where the alternative of renting in land is not allowed on this farm, the price of sweet potatoes would have to be below $1.43 per bushel and cotton price below $.199 per pound before both of these two crops drop out of the most profitable farm plan.

In going from sections F to E to D to C, sweet potato acreage increases, while cotton is not among the most profitable enterprises. In section C, when sweet potatoes are priced at $2.86 per bushel, it can be seen that cotton is not included in the most profitable farm or ganization, even at a cotton price of $.35 per pound. In this section, large acreages of sweet potatoes are produced, and tobacco accounts for a smaller part of net farm income than is true for any other section of the price map. Therefore, we see that, with increases in sweet potato and/or cotton prices, less land is profitably rented in, and smaller acreages of tobacco are profitably grown.

The second scales on both the horizontal and vertical axes of Figure 5 are for net income per acre of cotton and per acre of sweet potatoes. Thus, Figure 5 can be interpreted as showing the optimum farm organizations for different levels of net income per acre as well as for different prices. Changes in net income per acre can come about as a result of price changes, changes in cost, or changes in yield. For example, yields assumed in the initial analysis were 625 pounds lint cotton per acre and 180 bushels sweet potatoes per acre. With cotton at $.32 per pound, sweet potatoes would be eliminated from among the most profitable alternatives if the net income for sweet potatoes fell below $133 per acre. This net income would be acheived with a yield of 178 bushels with a sweet potato price of $1.85 per bushel. With sweet potatoes at $1.85 per bushel and with a yield of 180 bushels, cotton would be eliminated from the most profitable farm organization if the per acre net income fell below

$136 if the yield were less than 537 pounds lint per acre with a price of $.32 per pound.

Another important point to consider with respect to most profitable farm organizations for different price combinations is the extent by which net income decreases if the optimum farm organization for one set of prices is used when another set of prices exists. Suppose a farmer's production plan is that shown in section A of Figure 5, but cotton and sweet potato prices are those of another section of the price map, say section B. How much net income would the farmer lose by having the farm organization of section A instead of that of section B? The answers to this and similar questions for each price and enterprise combination are presented in Table 9. The largest amounts by which net returns of enterprise combination A could fall below the net return of the most profitable enterprise combinations for each of the sections of the price map are shown to the right of A. Reading horizontally on the line for enterprise combination A, it may be seen that if cotton and sweet potato prices fall somewhere in section B, the most that the net income of farm organization A would fall below that of B is $1,189. Similarly, with prices in section G, net returns of enterprise combination A would fall below net returns of enterprise combination G by no more than $545. With prices in sections E or F, net returns of enterprise combination A would fall below net returns of enterprise combinations E and F no more than $232 and $715, respectively. In the foreseeable future, it seems highly probably that cotton and sweet potato prices will fall within the confines of sections A, G, E, or F; and the loss of income as a result of choosing enterprise combination A when sweet potato and cotton prices fall in sections E, F, or G would not be great.

Changes in Wage Rate and Cost of Renting Land

Two factors which would be expected to have a great influence on most profitable farm organizations for Coastal Plain tobacco farms are wage rate and land rent.

On many farms in this area, farm income is dependent to a great extent on renting in land (and, hence, acquiring tobacco allotment). On such operations, a major cost to these farmers is the cost involved in renting cropland. This is especially true in view of the fact that tobacco and other cropland are usually rented together. As indicated previously, 15 per cent of all land rented is assumed to be tobacco allotment.

Labor is a major cost in tobacco production, and much of the required labor is seasonal in nature, with the peak

Table 9. Maximum amount by which net returns of other enterprise combinations would fall below those of most profitable combinations as prices of cotton and sweet potatoes are varied, farm with 15.5 acres of cropland owned

Most profitable enterprise combination for each section of price map a/	Section of price map in Figure 1 b/						
	A	B	C	D	E	F	G
A	0	1189	2421	368	232	715	545
B	587	0	435	227	783	2401	2292
C	728	177	0	87	725	725	2730
D	457	466	790	0	395	1681	1899
E	161	1363	2213	144	0	473	691
F	419	2113	3269	456	229	0	218
G	259	1895	3590	777	550	321	0

a/ See Figure 5 for most profitable enterprise combinations by section.

b/ See Figure 5 for range of cotton and sweet potato prices for each section of the price map.

labor requirement during the harvesting season. Production of cotton and sweet potatoes also requires a large proportion of the total labor required during the harvesting season. In practice, many farm families hire some labor during the peak labor periods for tobacco, cotton, and sweet potatoes. As indicated previously, some seasonal labor for these crops was assumed to be hired (in cases where family labor was limiting) throughout this study.

Changes in wage rates and in land rental rates were investigated on the 29-acre farm. It should be borne in mind that the wage rate varied is only that for the seasonal labor hired in the production of tobacco, cotton, and sweet potatoes. In the resource situation selected for further study, no additional investment capital was assumed available. Thus, the addition of a livestock enterprise could not be included in the most profitable adjustment opportunities. The situation chosen had 1.5 man-equivalents of family labor. Specialized tobacco harvesting and curing facilities were assumed available. Therefore, tobacco production was assumed to require no additional investment capital, and no overhead costs were charged to the enterprise.

The initial situation was analyzed with a land rental cost of $54.50 per acre and a wage rate of $.75 per hour. The most profitable farm organization at these costs is shown in section A of Figure 6. The other sections of the map show the most profitable combinations of enterprises as wage rates and cropland rental rates are varied over a range of costs. The wage rate is varied from $.35 to $1.50 per hour and cropland from $25 to $100 per acre.

In section A, 31.8 acres of land are profitably rented in and 2,720 hours of seasonal labor are hired in the production of tobacco, cotton, and sweet potatoes. The net income for the farm organization presented in section A is $5,405. The most profitable enterprise combination of section A is stable over a fairly wide range of wage rates and land rental costs. Thus, with land rented in at $54.50 per acre, the farm organization of section A remains the most profitable organization with a wage rate as high as $1.50 per hour. Similarly, with hired labor at $.75 per hour, the cost of renting land must increase above $92.00 per acre before a different farm organization becomes more profitable. However, with slightly lower wages and/or rent, the optimum farm plan changes. With wages constant at $.75 per hour, a different combination of enterprises becomes more profitable (section B) if land can be rented for less than $51 per acre. Also, a decrease in wages to about $.65, with no change in land rent, makes the optimum farm plan that of section B.

In sections B and C, more land is rented in at lower land costs and/or lower wages. When this occurs, more tobacco is produced, and corn acreage is increased. As tobacco acreage increases, more labor is hired because of the increased tobacco acreage.

In section D, a smaller amount of land is rented in relative to the most profitable farm organization of section A. The result is a decrease in tobacco and corn acreage with an increase in sweet potatoes. Tobacco acreage decreases ince tobacco is restricted to 15 per cent of the land rented in plus the 4.3 initial tobacco allotment. Sweet potatoes are increased at the expense of corn since sweet potatoes require less land per unit of net return than corn. Little change occurs in the most profitable quantity of labor hired in section D relative to section A. A smaller quantity of labor is hired in tobacco production, but more labor is hired in the production of cotton and sweet potatoes.

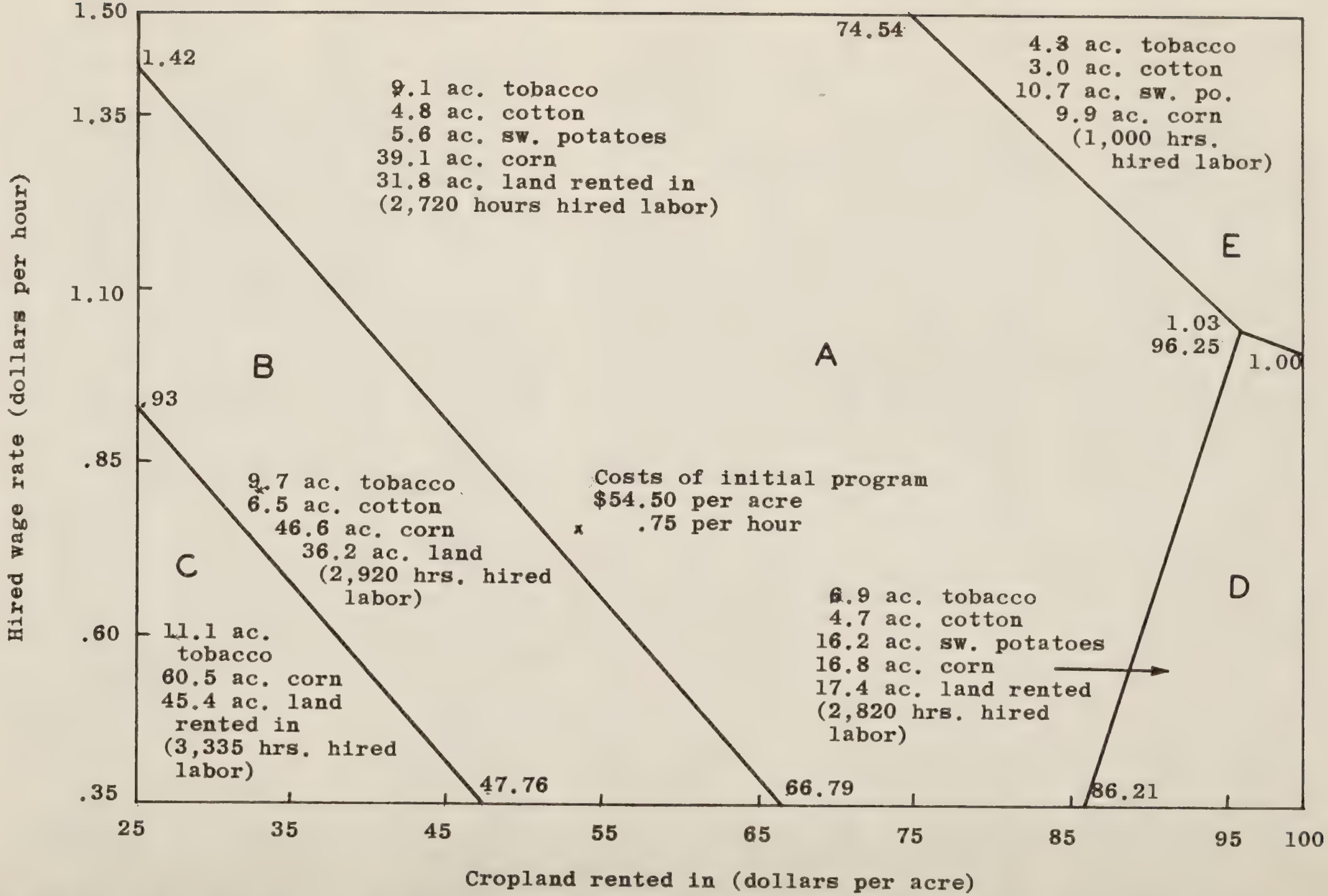

Figure 6. Most profitable enterprise combinations when wage rates and cost of renting land vary; farm with 29 acres cropland owned, 4.3 acres tobacco allotment, no additional investment capital, 1.5 man-equivalents of family labor

With wage rates and rental rates as those in section E, land renting was not profitable. However, even at the relatively high wage rates of this section, 1,000 hours of labor are hired in the production of tobacco and cotton in the most profitable farm organization.

The loss in net returns by maintaining the farm organization of section A when costs are as those in any other section of the map is not great unless wages and rents should be like those in section F.[1] In fact, the loss in income is less than $400 except when wages and rents are as those in section E, in which case the loss in income is $1,332. It can be concluded that the optimum farm organization of section A is generally stable as far as wage rates and land rents are concerned.

Changes in Tobacco Price and Cost of Renting Land

On farms renting land and growing tobacco, changes in either tobacco prices or in the cost of renting land would be expected to have a great impact, both on farm income and on the most profitable farm organization.

In the situation selected for price-mapping, the 29-acre farm was used. There were 1.5 man-equivalents of family labor (some seasonal hired labor was permitted where profitable) and $4,900 additional investment capital. The farm had a tobacco allotment of 4.3 acres and a cotton allotment of 3.0 acres. It was assumed that there were no tobacco barns or other specialized equipment for use in tobacco production on the farm. Thus, tobacco production at any acreage was assumed to require additional capital. This assumption of including the overhead costs for tobacco production is used in this and the two succeeding price maps. In effect, this means that the results pertain to a longer-run situation in which tobacco buildings and equipment would be expected to need replacement. This appears to be the reasonable assumption when investigating the effects of tobacco price changes, since the short-run situation for tobacco certainly indicates a known, stable price.

The enterprise combination for section A, Figure 7, was determined with tobacco at $.58 per pound and land

---

[1] Tables for this and each of the following price maps showing the maximum amount by which net returns of other enterprise combinations would fall below those of most profitable combinations are on file in the Department of Agricultural Economics, N. C. State College, Raleigh, N. C.

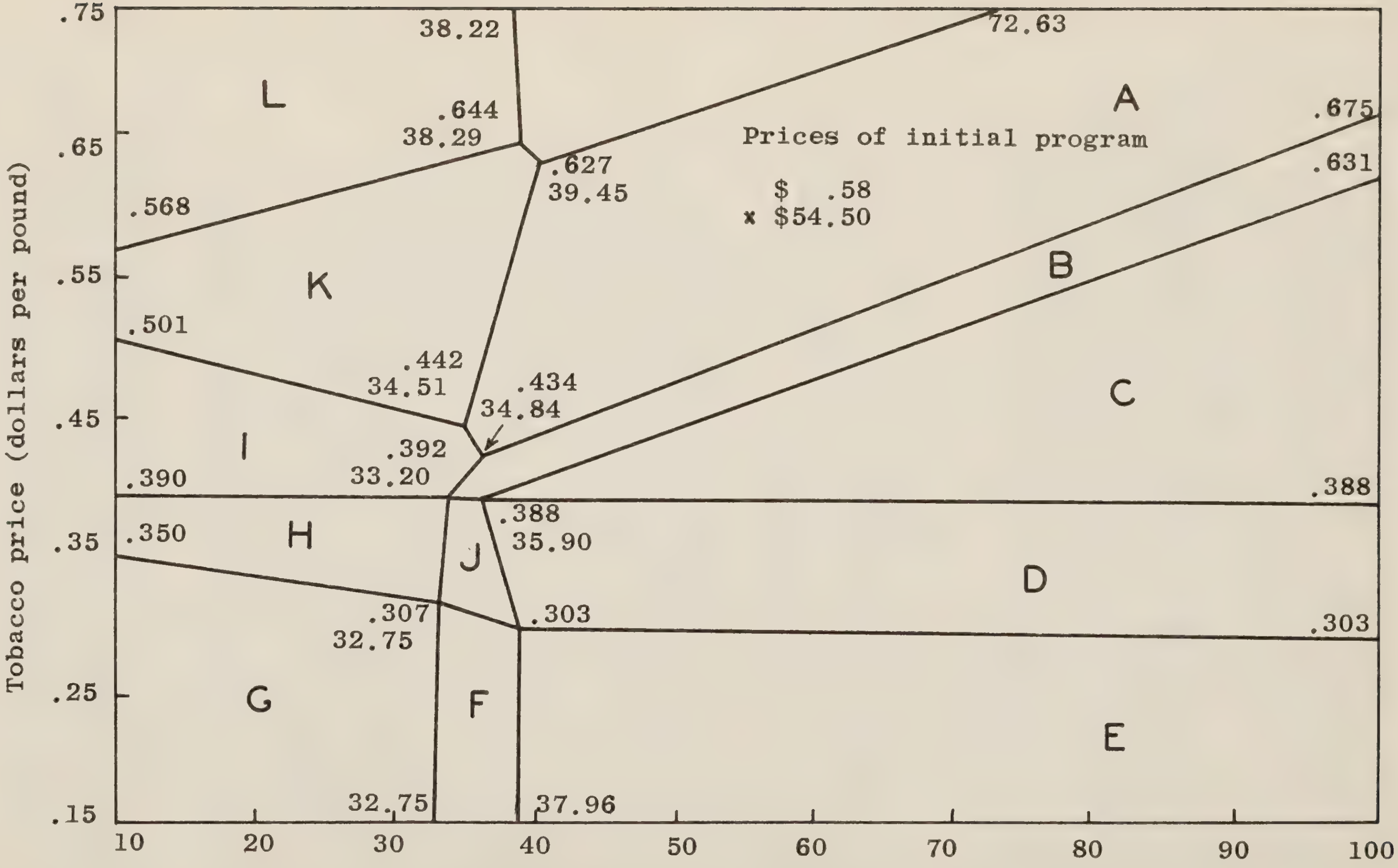

Figure 7. Price map of most profitable enterprise combinations, varying price of flue-cured tobacco and cost of cropland rented in, farm with 29 acres of cropland owned, 4.3 acres tobacco allotment, 1.5 man-equivalents family labor, $5,900 additional investment capital

rented in at $54.50 per acre (see Table 10). The most profitable farm organization of section A is stable over a fairly wide range of tobacco prices and land costs. Almost 30 acres of land are profitably rented in section A. With tobacco price at $.58 per pound, the enterprise combination presented in section A is the most profitable with land rent between $38.00 and $74.50 per acre. Similarly, with land rented in at $54.50 per acre, the enterprise combination of section A is most profitable when tobacco prices range between $.505 and $.683 per pound.

As shown in sections E, F, and G in Figure 7, tobacco is not among the most profitable alternatives when tobacco prices are below $.303 to $.350 per pound (depending on the cost of renting in land). With a tobacco price less than $.303 per pound, no land is profitably rented in at a cost exceeding $38.00 per acre. With no land rented in and no tobacco grown (section E), the farm resources are used in the production of cotton, sweet potatoes, layers, and hogs. These are enterprises requiring small amounts of land per unit of return. With land available to rent at lower costs, land is profitably rented in, and large acreages of corn are profitably produced. In section G, although tobacco is not among the most profitable alternatives, large acreages of land are profitably rented in and are used primarily for corn and wheat.

As tobacco price increases and the cost of renting land remains less than $33.00 to $38.00 per acre (sections G, H, I, K, & L), the acreage of land rented in remains about the same but the acreage of tobacco increases. In each of these sections, however, the acreage of tobacco is less than the available allotment. Large acreages of corn are profitable since the ratio of land to labor is very high. Large quantities of seasonal labor are hired in tobacco production at the higher tobacco prices. It should be pointed out that family labor is a limiting resource, and, if it were assumed that the operator could effectively supervise more hired labor and more operations were assumed to be done by hired labor, larger acreages of tobacco would probably enter the most profitable farm organization.

Renting in land is not profitable in sections C, D, or E of Figure 7. As shown in section C, as the cost of renting land increases, the higher must be the price of tobacco before land renting becomes profitable (note the upward slope of the boundary line between sections B and C in Figure 7. With a cost of $40.00 per acre for renting land, tobacco price must be higher than $.41 per pound before renting in land is profitable. If the cost of renting land increases to $85.00

Table 10. Most profitable combinations of enterprises under varying tobacco prices and land costs, farm with 29 acres cropland, 4.3 acres tobacco allotment, 1.5 man-equivalents family labor, $5,900 additional investment capital

Enterprise combinations	Enterprises in specified units									
	Tobacco (acres)	Cotton (acres)	Corn (acres)	Sweet potatoes (acres)	Wheat (acres)	Rented cropland (acres)	Layers (no.)	Hogs (no. sows)		Labor hired (hr.)
								on pasture	on concrete	
A	8.8	4.6	36.3	5.5	0	29.7	0	0	0	2,640
B	5.4	3.8	0	16.5	0	7.3	75	8	3	2,385
C	4.3	3.0	0	17.3	0	0	750	3	0	1,945
D	1.3	3.0	0	17.4	0	0	925	6	0	965
E	0	3.0	0	18.3	0	0	1050	7	0	975
F	0	4.3	0	16.6	0	12.1	0	18	0	985
G	0	12.5	75.7	0	15.0	94.6	0	18	0	755
H	1.4	12.0	72.2	0	15.0	89.9	0	16	0	755
I	7.5	7.0	81.2	0	15.0	91.0	0	0	4	2,745
J	1.1	4.1	0	16.0	0	10.7	0	16	0	970
K	9.5	7.5	91.8	0	0	81.9	0	0	35	2,960
L	10.9	0.8	103.1	0	0	88.6	0	0	0	3,270
M	10.9	0.8	58.7	0	0	44.1	0	0	0	3,270

per acre, a tobacco price higher than $.575 per pound is required before renting land becomes profitable.

With flue-cured tobacco prices similar to those of recent years, land renting appears to be profitable over a fairly wide range of land rental costs. Likewise, even with a very high cost of renting in land and with all overhead costs included, tobacco is among the most profitable alternatives--even at prices much lower than average tobacco prices of recent years.

The failure to adjust the most profitable farm organization in response to changes in tobacco price or land costs could result in severe reductions in net farm income. This is true since tobacco is the major component of farm income. For example, if tobacco price decreases to less than $.45 per pound, with the cost of renting land constant at $54.50 per acre, enterprise combination C would then be more profitable than that of section A. If the farmer did not change his production plan in response to the change in prices, his net returns could be as much as $2,216 below the net return of the farm organization presented in section C. On the other hand, if tobacco prices and land costs are those in section B, enterprise combination A would produce a net return which would be no more than $267 below the net revenue of farm organization B. Since sections A and B include a rather wide range of tobacco prices and land rental costs, the likelihood of tobacco prices and land rental costs not being among those included in these sections seems rather remote. Thus, if a farmer (with resources similar to those of the situation price-mapped) chooses the farm organization of section A, there seems to be little chance that he will suffer large losses in farm income over the next few years because of having the wrong farm organization for existing tobacco prices or costs of renting land.

Changes in Interest Rate and Cost of Renting Land

A major impediment to efficient agricultural production on many North Carolina farms is the low ratio of land and capital to labor. In some cases, additional capital to provide facilities required in livestock production is not available. In such instances, farmers are severely limited in adjustment possibilities. In such cases, effective farm size is often increased by renting in additional cropland. In other situations, additional capital is available, and the operator is faced with the decision to add livestock facilities on his own farm and specialize in those enterprises requiring small amounts of land per unit of return, e.g., poultry and hogs, or to increase farm acreage by renting in or buying land.

In view of the potential substitution possibilities between land and capital, information is needed concerning the manner in which changes in land rent and/or interest rate affect the most profitable farm organization. A situation from the 52-acre farm was selected for price-mapping. Investment capital in amounts up to $19,400 was assumed available on this farm. Two full-time workers constituted the family labor supply.

The initial situation was analyzed with a land rental cost of $54.50 per acre and an interest rate of 6 per cent. It was assumed that no specialized production or curing facilities for tobacco were available so that tobacco production was assumed to require investment capital. Tobacco was the only crop enterprise in which specialized facilities were assumed to be required but not already owned. On the other hand, the production of all livestock enterprises considered in the analysis, including hogs, layers, and broilers, was assumed to require facilities not presently on the farm.

The most profitable farm organizations over a range of interest rates and land rental costs are presented in Figure 8. The farm organization presented in section A was determined with the initial land and interest costs and is stable for a wide range of interest costs. When the cost of renting land is held constant at $54.50 per acre, the interest rate would have to increase above 23 per cent before a new farm organization would be more profitable. The farm organization of section A remains most profitable for interest rates between 0 and 15.6 per cent as long as the cost of renting in land is more than $38 per acre and less than $65.50 per acre. With a cost of renting land below $38 per acre and with lower interest rates, the acreage of land profitably rented in increases from 5.3 to 69.8 acres. Corn acreage is increased to the exclusion of sweet potatoes. Enterprises requiring additional capital, i.e., tobacco and hogs, remain almost unchanged in the most profitable farm organizations of sections A and B.

The effects of increasing interest rates on the most profitable farm organization when costs of renting land are constant between $25 and $38 per acre may be seen by comparing sections B and C. As interest rates increase above 9 to 15.6 per cent (depending on the cost of land), more land is rented in; more tobacco and corn are profitably produced, and hogs are eliminated from the most profitable

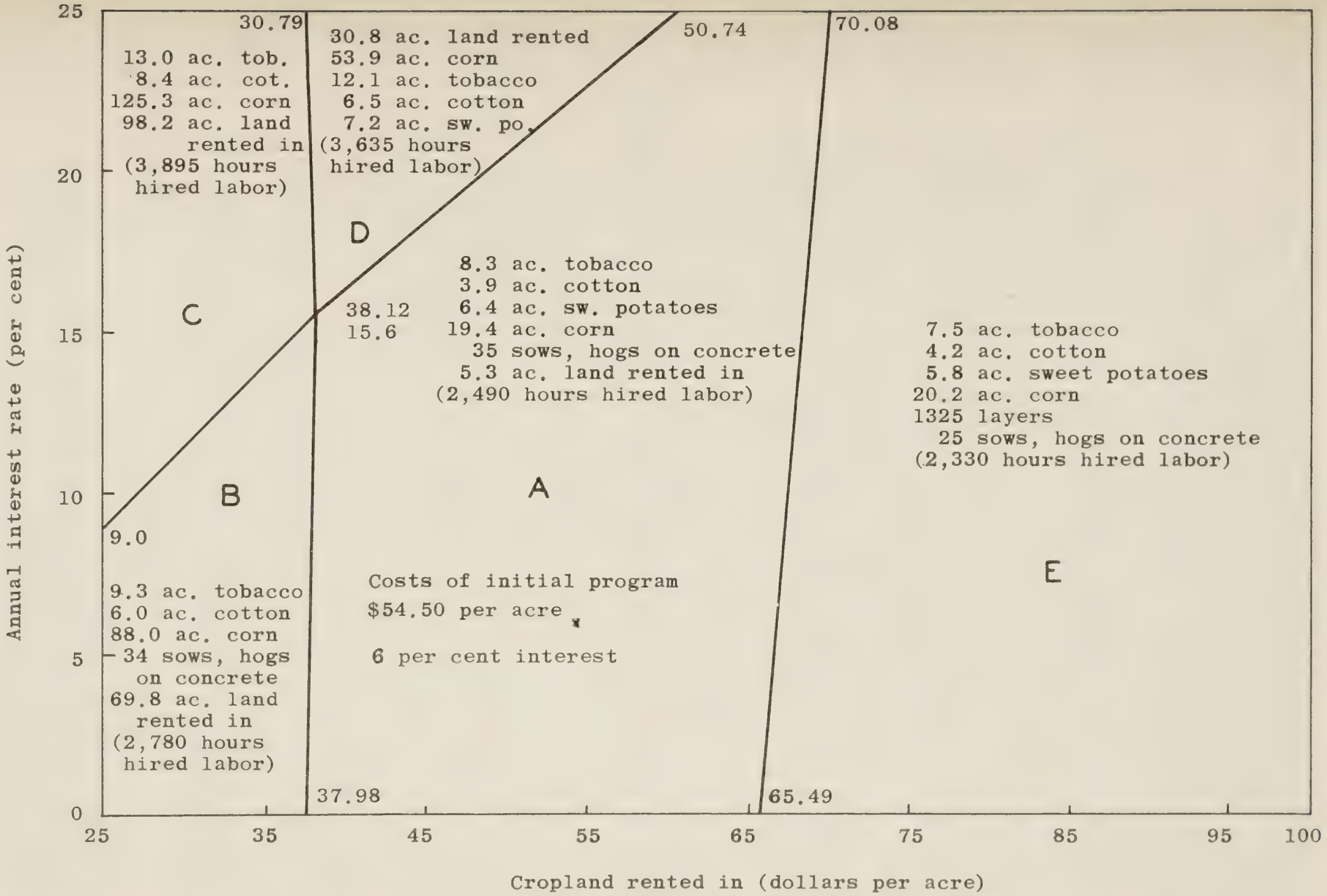

Figure 8. Most profitable enterprise combinations when interest rates and cost of renting land vary; farm with 52 acres cropland owned, 7.5 acres tobacco allotment, $19,400 additional investment capital, two man-equivalents family labor

enterprise combination. That is, as land becomes less limiting and capital more limiting in relation to labor, enterprises requiring either more land (corn) or less capital (tobacco) per unit of return are increased at the expense of those enterprises requiring small amounts of land and large amounts of capital per unit of return, e.g., hogs.

Section A is a large and stable area, and land cost must increase above $65.49 to $70.08 (depending on the interest rate) before it is no longer profitable to rent land. A layer enterprise which requires large amounts of capital but no cropland per unit of return, is added at the expense of hogs and tobacco in section B. Tobacco acreage is restricted to the farm allotment since land renting is not profitable when land costs are as those of section E.

The information presented in Figure 8 indicates that changes in most profitable farm organization are more dependent on land costs than on interest rates on tobacco farms. That is, with the cost of renting land above $38 per acre, extremely high interest rates are required to affect the most profitable farm organization. This is consistent with expectations, however, since the cost of land comprises a much higher portion of total production costs, at least on tobacco farms, than is true for interest.

IMPLICATIONS

The most profitable combinations of crop and livestock enterprises on flue-cured tobacco farms vary with the quantities of land, labor, and capital available. Some enterprises are more profitable on large farms; other enterprises are better adapted to farms which are small in terms of cropland. A number of factors which influence the profitability of different enterprises and which influence production and resource adjustments on tobacco farms in the Central Coastal Plain are summarized in this section.

Conditions Influencing Crop and Livestock Production

Tobacco

Tobacco, with a yield of 1800 pounds per acre and a price of $.58 per pound, was profitable in each resource situation considered in this study. In all situations seasonal hired labor was assumed available. Tobacco was particularly profitable on small farms and in other resource situations where labor was plentiful in relation to land. On such farms, an increase in tobacco allotment resulted in large increases in net farm income. On the larger farms, large quantities of hired seasonal labor were required for profitable tobacco production. Even with large quantities of hired labor, however, the net return per acre from tobacco, under present price support programs, is higher than the return for other crops considered in this study, and tobacco remained a profitable alternative for the farms.

Tobacco, under present conditions, is profitable over a wide range of tobacco prices and yields. This was true in this study even when a cost was included for the specialized facilities used in tobacco production. At a yield of 1800 pounds per acre, tobacco was included in the most profitable farm organization at prices as low as $.20-$.30 per pound. Stated differently, at a price of $.58 per pound, tobacco was profitable at yields as low as 620-930 pounds per acre. The net returns for tobacco at these yield and price combinations is $60 to $240 per acre.

Cotton

Cotton was a profitable alternative over a wide range of yields and prices in many resource situations, particularly in situations restricted to small acreages of cropland. For example, on a farm restricted to 15.5 acres cropland, cotton was profitable at a net return as low as $30 per acre. This return can be obtained with a cotton price of $.20 per pound when the yield is 625 pounds per acre (or, with a yield of 425 pounds at a price of $.27 per pound). When land was rented on this small farm, a net return greater than $73.50 per acre was required for cotton to be among the most profitable alternatives. This return can be obtained with a yield of 625 pounds per acre at $.27 per pound.

On larger farms, with a yield of 625 pounds per acre, cotton will likely be profitable if seasonal labor can be profitably hired. Cotton requires most of its labor during the harvesting season. As a result, the profitability of cotton is greatly influenced by the availability and cost of harvesting labor or by the cost and efficiency of mechanical harvesting.

Sweet Potatoes

Sweet potatoes were a profitable alternative on the smaller farms and in other resource situations which have large quantities of available family labor. At the present time, sweet potato production in the Central Coastal Plain is on a limited scale, and a number of problems are limiting an expansion in sweet potato acreage. One major problem is the large element of risk associated with sweet potato production and marketing. Although sweet potatoes appear to be a profitable alternative under present conditions, large increases in sweet potato production will require curing and storage facilities and/or additional, dependable market outlets.

When sweet potatoes were arbitrarily eliminated as a possible enterprise, changes in net farm income were most pronounced on the 15.5-acre farm. For example, with 1.5 units of family labor and no additional capital, net farm income decreased from $2,800 to $1,900 when sweet potatoes were arbitrarily eliminated. In this case, cotton and corn were substituted for sweet potatoes, but cotton was restricted to the farm allotment. When cropland acreage was increased, or investment capital added, there was much less change in net farm income when sweet potatoes were eliminated. For example, on the small farm, with cropland rented and 1.5 units of family labor, there was virtually no decrease in net farm income when sweet potatoes were eliminated. With sweet potatoes out, more cropland was rented; and tobacco, cotton, and corn acreages were increased.

On farms where labor is plentiful relative to land and capital, sweet potatoes, under prices assumed in this study ($1.85 per bushel), are a good production possibility. This is especially true where the producer does an excellent job and achieves a sweet potato yield greater than the yield assumed in this study (180 bushels per acre). On many small farms, net farm income can be increased by adding sweet potatoes if the farmers are willing to take the risk and if a yield of approximately 200 bushels per acre can be attained. However, with a slight decrease in yield and/or price, sweet potatoes are no longer among the most profitable production possibilities.

Corn and Small Grain

Corn was one of the enterprises in the most profitable farm organizations for most resource situations. A fairly high corn yield (70 bushels per acre) was assumed. In cases where such yields are not obtained, corn will be relatively less profitable. Corn requires smaller amounts of labor but larger amounts of land per unit of net return relative to the other crops considered in this study. Consequently, large acreages of corn were profitable in all cases in which larger acreages of cropland were owned or where rented cropland was available. Wheat also was among the most profitable alternatives in several of the situations with large amounts of land and small amounts of labor.

Hogs and Layers

Hogs and/or layers are profitable alternatives in farm situations having small acreages of cropland. However, in cases where additional land can be rented, or where larger acreages of cropland are owned, a layer or hog enterprise has little effect on net farm income. In cases where suitable labor can be hired in the production of layers and hogs, these enterprises could have a greater effect on farm income. As budgeted in this study, hogs are slightly more profitable than layers in all cases where farm size can be increased by renting cropland. On smaller farms, or in other situations having high ratios of labor to land, layers rather than hogs enter the most profitable combinations of enterprises when additional capital is provided. In general, hogs and layers are close substitutes in production, and only a slight change in hog or egg prices is required to change their relative profitability.

A concrete system of hog production, as contrasted with a pasture system, requires more capital but less land and labor per unit of return. The concrete system of hog production was more profitable in most resource situations of this study.

As budgeted in this study, layers require more labor but less capital per unit of return than do broilers. Broilers at a contract price of $.05 per bird were never among the most profitable alternatives. However, with a slight decrease in egg prices, broilers were more profitable than layers. For example, on the 29-acre farm with 1.5 units of labor and $11,800 added capital, and with eggs at $.34 per dozen, layers were among the most profitable alternatives. However, with a decrease of one-half cent per dozen in egg prices, layers were eliminated, and broilers and hogs were added. Net farm income was decreased only $100.

Cattle

Beef cattle were not included among the production alternatives in this study. Beef cattle, at least the usual cow-calf operations, are best adapted where pasture land has low opportunity returns. Very little land of this type is now available in the Central Coastal Plain. Where such land is available, beef cattle may offer opportunities to increase farm incomes. In addition, for farmers who have the necessary skill and adequate capital, dry-lot feeder cattle operations may supplement farm incomes. However, it seems unlikely that such operations, on a profitable scale, offer alternatives for a large proportion of farmers in this area.

Resource Adjustments

Small farms are often characterized by large amounts of labor and small amounts of land and capital facilities. Family labor, on such farms, can be more profitably utilized if additional cropland and/or livestock and livestock facilities can be obtained. In addition to acquiring additional land and capital resources, farmers with large amounts of family labor may employ some of the labor in off-farm employment.

Renting Cropland or Adding Livestock

In resource situations of this study, increasing cropland (by renting land) resulted in large increases in net farm income, particularly on the smaller farms. Within limits, adding capital (so that livestock can be considered) and adding land are good substitutes in terms of their effects on net farm income. Generally speaking, under current agricultural programs, there is a greater element of risk associated with the prices of eggs and hogs than with tobacco, cotton, and corn prices. This is true because tobacco, cotton, and corn are eligible for price supports, while eggs and hogs are not eligible. In addition, in livestock production, resources must be committed for a longer period of time relative to the resource commitment in crop production. After capital is invested for hog or poultry facilities, these facilities usually are of little value in other uses. Thus, the farmer without livestock has relatively more flexibility in terms of changing his farm organization. However, the farmer with livestock is usually able to utilize his labor more fully during the winter and spring. In cases where additional land (including tobacco) is assumed rented, providing additional capital facilities for a hog or layer enterprise has little effect on net farm income unless labor can be hired in livestock production. A large proportion (two-thirds to three-fourths) of net farm income in such cases is derived from tobacco. In cases where land may be rented, but with no tobacco, the potential income effect from adding livestock will be much greater.

Buying Land

When an operator is dependent on rented land, he is usually uncertain about the length of time he will have the land under present rental arrangements. Furthermore, he is uncertain with respect to the land rental value in future years. In addition, there are always problems regarding permanent-type improvements on rented land. If additional land is purchased, the operator can plan his operation with much more certainty than is true when land is rented. Under present price support programs, less risk is associated with a cropland investment when contrasted with an investment in livestock and livestock facilities. Thus, if farm operators have or can obtain additional capital, the capital may be used to buy land rather than to acquire livestock and livestock facilities.

If cropland is available to buy, what price might a farmer profitably pay for the land? One measure which can be used to get an indication of the value of land is to capitalize the rental value. In this study, a cropland rent of $54.50 per acre was assumed (15 per cent of each acre was considered available for tobacco production. If capital can be obtained at 6 per cent, a purchase price of $835 per acre would be equivalent to a rental charge of $54.50 per acre.1/ Similarly, for a capital charge of 10 per cent, a purchase price of $520 per acre would be equivalent to a land rent of $54.50 per acre. These are estimates of prices per acre of cropland. The value ($400 per acre) used in estimating farm values in Section III was based on all farm land and buildings.

In the production of crops requiring large amounts of seasonal labor, supplementing family labor with hired labor often will result in large increases in farm income. The farm plans presented in this report assume that large quantities of seasonal labor can be hired at specific wage rates. If hired labor is not available at the assumed wage

---

1/ Based on a tax rate of $1.50 per hundred dollars on 35 per cent of the estimated land value per acre. The following formula was used to capitalize cropland rent at a rate of 6 per cent:

$$V = \frac{54.50 - .0150\ (.35V)}{.06}$$

where V = estimated land value per acre.

rates, farm incomes will be less than those presented. On the other hand, if an operator can obtain and manage larger quantities of labor than assumed in this study (or, if labor can be obtained at a lower wage) profits may well be greater than those presented. Many tobacco farmers in the Central Coastal Plain are dependent on hired labor, especially during the harvesting season. Changes in wage rates and in the availability of labor will greatly affect the farm organization on such farms.

Off-Farm and Part-Time Work

A part-time job appeared profitable on very small farms with no capital and no land to rent. However, when the operator works off the farm, crop and livestock production may become less efficient because of decreased managerial supervision for the farm enterprises. The timeliness of many farming operations is very important, and a lack of supervision may result in jobs not getting done at the crucial time. Where sizeable quantities of labor are hired, proper supervision of the labor is very important. However, in situations where a member of the operator's family other than the operator is engaged in an off-farm job, management, in most cases, will not be adversely affected.

Many farmers work part time during the winter months in nonfarm work. Where little livestock is owned, the seasonal off-farm work has little effect on labor required for the farming operation. Such seasonal-type, off-farm employment was not considered in this study. In situations where such work is available, income to farm families may be increased substantially.

Sharecroppers or Hired Labor

On large farms, the farm operator may operate his farm with tenants, or he may hire the seasonal labor required to supplement the labor of his family. Generally speaking, more supervision (including transportation) is required when the farm is operated with hired labor. If the operator depends on hired labor, sufficient labor may not be available at critical periods. Also, the operator must assume all risks when the farm is operated with hired labor. However, if the operator is able and willing to assume the responsibility and take the risk, net income to the operator in many cases will be increased by hiring large quantities of seasonal labor rather than by operating the farm as a multiple unit.

With the 29 per cent reduction in allotted flue-cured acreage from 1955-1957, the number of sharecropper families in the Central Coastal Plain decreased 21 per cent.1/ Though there have been no further reductions in tobacco acreage since 1957, increases in labor productivity have resulted in the displacement of additional cropper families. Some of these families have moved to nonfarm employment, while others are engaging in "day work." In cases where tenants obtain nonfarm work, it is possible that both the operator and the cropper have improved their income status by the substitution of seasonal hired labor for tenant labor. The displaced croppers, employed as day workers in some cases, are also employing their labor more fully than was previously true.

Age of Operator

The operator's age greatly influences changes in farm organization. Many farm operators are well along in years. In 1957, more than 20 per cent of a sample of farm operators in the Central Coastal Plain were more than 60 years of age. Almost half of these farmers were more than 50 years of age.2/ Few of these older farmers are interested in investing large amounts of capital, either in a livestock enterprise or in buying additional land. Instead, where expansion is desired, a more rational adjustment would be to rent in additional cropland. Many of the older farmers do not wish to expand their operation but are forced to cut back on their farming operation. In such cases, the operators often tend some of the land and rent out the remaining acreage. In other cases where farm operators are younger and are willing to assume more risk, additional investments in land or livestock are being made. These farmers also are renting cropland from their neighbors.

Level of Management

The net return for each crop and livestock enterprise considered in this analysis assumes a fairly high level of managerial ability. Some farmers consistently "have better luck" with certain crops or livestock enterprises than with other. If this is true, these farmers should consider such information in adjusting their farm organization. As

---

1/ E. C. Pasour, Jr., W. D. Toussaint, and G. S. Tolley, op. cit., p. 41.

2/ Ibid., pp. 30 and 50.

indicated earlier, some substitution may be made in the most profitable farm plans of this study with little decrease in net farm income. For example, one farmer may prefer to work with hogs rather than layers. Such an individual will probably be better off to produce hogs rather than eggs.

The farm plans developed in this study are merely guides. Furthermore, a good farm organization does not guarantee an efficient operation. To increase farm incomes, farm operators must have good farm organizations and efficient plans of production. For any of the farm plans discussed in this study, farm incomes can be increased substantially by increasing yields above the assumed levels. For example, if tobacco yield is increased 200 pounds per acre, net returns would be increased about $100 per acre. Conversely, if the yields obtained are less than those assumed, incomes will be reduced. In all cases, the level of management and efficiency of production will play an important part in determining the profitability of the farming operation.

Appendix Table 1. Annual income and expenses per acre for crop enterprises budgeted, Central Coastal Plain, N. C.

Item	Wheat	Corn	Soybeans	Sweet potatoes	Cotton	Tobacco
Income:						
Yield (specified units)	35 bu.	70 bu.	30 bu.	180 bu.	625 lbs.	1800 lbs.
Price (dollars)	1.75	1.10	2.05	1.85	.32	.58
Total returns (dollars)	61.25	77.00	61.50	333.00	223.32 a/	1044.00
Expenses: (dollars)						
Seeds or plants	4.69	1.80	3.50	45.00	1.70	3.00
Fertilizer	16.25	26.75	10.80	25.21	19.50	43.43
Custom work	6.50	6.00	6.50	--	--	--
Insect & disease control	.60	--	1.50	27.50	7.20	33.70
Tractor operating expense	2.22	3.84	3.90	16.65	6.84	21.00
Insurance	--	--	--	--	--	50.00
Other	--	--	5.94	83.00	20.11	83.50
Total cash costs	30.26	38.39	32.14	197.36	55.35	234.63
Net returns	30.99	38.61	29.36	135.64	167.97	809.37
Annual man labor required (hrs.)	4.6	7.0	7.6	114.2	112.3	425.0

---

a/ Includes 1060 lbs. cottonseed at $.022 per pound.

Appendix Table 2. Annual income and expenses for livestock enterprises budgeted, Central Coastal Plain, N. C.

Item	Broilers 10,000/brood 4 1/2 broods/year	5,000 Layers	Hogs (8 sows) 2 litters per yr. on concrete	Hogs (8 sows) 2 litters per year on pasture	Hogs (8 sows) 1 litter per year on pasture
Income:					
Production--main product (spec. unit)	44,100 birds	20 doz. per bird	116 at 200 lbs.	116 at 200 lbs.	58 at 200 lbs.
Price (dols.)	.05/bird (con.)	.33/doz.	16.00/cwt.	16.00/cwt.	16.80/cwt.a/
Value of other products sold (dols.)	--	3,016.00	408.00	408.00	364.00
Total returns (dols.)	2,205.00	34,366.00	4,120.00	4,120.00	2,312.80
Expenses:(dols.)					
Feed	Contract	24,143.00	2,450.02	2,411.79	1,146.34
Annual exp. on added investment capital	724.00	2,701.00	447.76	328.50	214.61
Other	474.00	3,241.00	414.40	414.40	620.38
Total cash costs	1,198.00	30,085.00	3,312.18	3,154.69	1,981.33
Net returns (dols.)	1,007.00	4,281.00	807.82	965.31	331.47
Man labor req. (hrs./year)	562	2,708	345	498	236
Added inv. cap. req. (dols.)	5,090.00	17,249.00	3,386.00	2,525.00	1,446.00
Land required by enterprise (ac.)	--	--	3.9	8.7	5.0

a/ Hogs sold in June assumed to be 105 per cent of annual average.

Appendix Table 3. Single-unit farms--ranked on the basis of total cropland, Wilson County, North Carolina

Total cropland per farm (acres)	Number farms	Per cent of total single units	Total land (acres)	Average total land (acres)	Total cropland (acres)	Average cropland (acres)	Total cotton (acres)	Average cotton (acres)	Total tobacco (acres)	Average tobacco (acres)
Less than 10.0	137	10.74	2,467.5	18.01	890.9	6.50	134.3	.98	201.58	1.471
10.0 - 19.9	340	26.64	11,655.7	34.28	5,268.9	15.49	656.2	1.93	884.59	2.602
20.0 - 29.9	297	23.27	15,212.1	51.22	7,247.4	24.40	813.4	2.74	1,079.14	3.633
30.0 - 39.9	206	16.14	13,883.0	67.39	7,064.9	34.29	662.1	3.21	1,024.74	4.974
40.0 - 49.9	118	9.25	9,769.1	82.79	5,258.5	44.56	455.0	3.85	743.52	6.301
50.0 - 74.9	117	9.17	13,064.3	111.66	6,975.2	59.62	526.9	4.50	1,010.54	8.637
75.0 - 99.9	38	2.98	5,364.9	141.18	3,181.9	83.73	210.8	5.55	444.26	11.691
100.0 - 149.9	18	1.41	3,636.2	202.01	2,171.0	120.61	204.2	11.34	306.56	17.031
150.0 - 199.9	3	0.23	1,171.0	390.33	554.1	184.70	13.3	4.43	54.04	18.013
200.0 - 249.9	1	0.08	320.0	320.00	230.0	230.00	18.7	18.70	34.26	34.260
250.0 - 299.9	0	0	0	0	0	0	0	0	0	0
300.0 - 399.9	1	0.08	842.0	842.00	362.0	362.00	43.8	43.80	50.83	50.830
Total and averages	1276		77,385.8	60.6	39,204.8	30.7	3,738.7	2.9	5,834.06	4.57

Source: Wilson County Agricultural Stabilization and Conservation farm records.

Appendix Table 4. Multiple-unit farms, ranked on the basis of total cropland, Wilson County, North Carolina

Total cropland per farm (acres)	No. of farms	Per cent of total multiple units	Total land (acres)	Average total land (acres)	Total cropland (acres)	Average cropland (acres)	Total cotton (acres)	Average cotton (acres)	Total tobacco (acres)	Average tobacco (acres)	Total no. of croppers	Average no. of croppers
Less than 10.0	11	1.29	279.6	25.42	79.7	7.24	18.1	1.64	22.38	2.034	14	1.3
10.0 - 19.9	62	7.30	2,188.7	35.30	973.0	15.69	131.7	2.12	168.67	2.720	74	1.2
20.0 - 29.9	103	12.13	5,805.0	56.36	2,548.4	24.74	264.8	2.57	398.80	3.871	124	1.2
30.0 - 39.9	102	12.02	7,155.1	70.15	3,573.3	35.03	379.5	3.72	529.64	5.192	132	1.3
40.0 - 49.9	89	10.48	8,252.7	92.73	3,978.3	44.70	362.9	4.07	577.38	6.487	120	1.3
50.0 - 74.9	152	17.90	19,111.3	125.73	9,461.1	62.24	783.5	5.15	1,382.99	9.098	259	1.7
75.0 - 99.9	99	11.66	15,640.9	157.98	8,581.6	86.68	729.5	7.37	1,241.35	12.538	209	2.1
100.0 - 149.9	106	12.48	25,233.3	238.05	12,819.6	120.94	1,012.4	9.55	1,828.13	17.246	290	2.7
150.0 - 199.9	48	5.65	15,469.6	322.28	8,364.7	174.26	657.4	13.69	1,151.61	23.992	169	3.5
200.0 - 249.9	33	3.88	14,361.3	435.19	7,302.7	221.29	609.7	18.47	1,064.47	32.256	135	4.1
250.0 - 299.9	12	1.41	6,574.0	547.83	3,332.4	277.70	273.0	22.75	520.11	43.342	61	5.1
300.0 - 399.9	16	1.88	11,706.8	731.67	5,477.9	342.37	401.7	25.11	757.96	47.372	94	5.9
400.0 - 499.9	9	1.06	7,631.0	847.89	3,888.9	432.10	254.7	28.30	541.47	60.163	48	5.3
500.0 - 999.9	6	.70	7,636.0	1,272.66	3,807.8	634.63	212.5	35.42	529.22	88.203	52	8.6
1000 and over	1	.12	2,265.7	2,265.70	1,310.0	1,310.00	78.1	78.1	181.85	181.85	26	26.0
Total and averages	849		149,311.0	175.9	75,499.4	88.9	6,169.5	7.3	10,896.03	12.83	1,807	2.1

Source: Wilson County Agricultural Stabilization and Conservation farm records.

Appendix Table 5. Hours of cropper family labor available by two-month periods for multiple-unit farms a/

Labor period	75-acre farm, two cropper families	121-acre farm, three cropper families
	(hours)	
December-January	1,396	2,094
February-March	1,332	1,998
April-May	1,448	2,172
June-July	1,524	2,286
August-September	1,524	2,286
October-November	1,368	2,052
Total	8,592	12,888

---

a/ Each cropper family was assumed to have available 1.8 man-equivalents of labor. The method of converting man-equivalents labor to an hourly basis is presented in Table 3.

Appendix Table 6. Most profitable enterprise combinations, single-unit farms, 1.5 man-equivalents of family labor, no land rented in

Item	No additional capital			Lower level capital			Upper level capital		
	Cropland owned per farm			Cropland owned per farm			Cropland owned per farm		
	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres
Enterprises in specified units:									
Tobacco (ac.)	2.6	4.3	7.5	2.6	4.3	7.3	2.6	4.3	4.6
Cotton (ac.)	0	3.0	4.2	1.8	3.0	4.2	1.9	3.0	2.9
Corn (ac.)	0	0	24.7	0	0	27.5	0	16.5	21.0
Sweet potatoes (ac.)	12.2	20.6	13.7	10.5	14.4	0	10.4	4.1	0
Layers (no.)	0	0	0	985	1,185	0	1,970	3,425	0
Hogs (brood sows kept)	0	0	0	0	6	23	0	0	46
(market hogs raised on concrete)	0	0	0	0	0	368	0	0	736
(market hogs raised on pasture)	0	0	0	0	96	0	0	0	0
Labor hired (hrs.)	95	1,885	2,785	330	1,900	1,980	655	1,475	1,300
Total returns less cash costs	$3,705	$5,465	$7,715	$4,455	$6,340	$8,685	$5,070	$7,130	$8,830
Farm overhead costs	905	1,510	2,355	905	1,510	2,355	905	1,510	2,355
Net farm income	$2,800	$3,955	$5,360	$3,550	$4,830	$6,330	$4,165	$5,620	$6,475

Appendix Table 7. Value of marginal product for each limiting resource, single-unit farms, 1.5 man-equivalents of family labor, no land rented in

Limiting resources	Value of marginal products								
	No additional capital			Lower level capital			Upper level capital		
	Cropland owned per farm			Cropland owned per farm			Cropland owned per farm		
	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres
Family labor (per hour)									
Apr.-May	.00	1.45	.175	.05	1.60	.00	.95	.45	.00
June-July	.00	.00	2.25	.00	.90	9.95	.00	2.80	9.75
Aug.-Sept.	1.20	1.10	.50	1.15	.45	.00	1.05	.00	.25
Oct.-Nov.	.00	.00	.00	.45	1.15	.00	.50	1.60	.00
Investment capital (per dol.)	.22	.18	.13	.21	.14	.02	.18	.10	.02
Land (per acre)									
Cropland	178.60	133.35	98.10	165.30	105.55	39.50	135.00	95.00	38.60
Tobacco allotment	542.50	578.60	494.50	544.70	539.75	a/	568.00	453.60	a/
Cotton allotment	a/	103.80	100.50	a/	71.95	47.80	89.25	61.30	a/

a/ Allotment was not limiting.

Appendix Table 8. Most profitable enterprise combinations, single-unit farms, 1.5 man-equivalents of family labor, land rented in a/

Item	No additional capital			Lower level capital			Upper level capital		
	Cropland owned per farm			Cropland owned per farm			Cropland owned per farm		
	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres
Enterprises in specified units:									
Tobacco (ac.)	9.0	9.1	9.1	8.2	7.5	7.3	7.3	6.0	4.6
Cotton (ac.)	4.7	4.8	4.8	4.1	3.8	4.2	3.6	2.8	2.9
Corn (ac.)	36.5	39.1	41.0	28.8	25.3	27.5	0	11.7	21.0
Sweet potatoes (ac.)	5.8	5.6	5.4	5.6	5.3	0	5.5	5.0	0
Hogs (brood sows kept)	0	0	0	8	14	23	16	28	46
(market hogs raised on concrete)	0	0	0	128	224	368	256	448	736
Labor hired (hours)	2,700	2,720	2,725	2,445	2,255	1,980	2,180	1,800	1,300
Land rented in (ac.)	42.8	31.8	10.6	37.2	21.6	0	31.3	11.6	0
Land rented and owned (ac.)	58.3	60.8	62.6	52.6	50.6	52.0	46.7	40.6	52.0
Total returns less cash costs	$6,205	$6,915	$8,140	$6,385	$7,200	$8,685	$6,550	$7,500	$8,830
Farm overhead costs	905	1,510	2,355	905	1,510	2,355	905	1,510	2,355
Net farm income	$5,300	$5,405	$5,785	$5,480	$5,690	$6,330	$5,645	$5,990	$6,475

a/ No cropland was rented on the 52-acre farm when additional investment capital was provided.

Appendix Table 9. Value of marginal product for each limiting resource, single-unit farms, 1.5 man-equivalents of family labor, land rented in

Limiting resources	Value of marginal products								
	No additional capital			Lower level capital			Upper level capital		
	Cropland owned per farm			Cropland owned per farm			Cropland owned per farm		
	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres
Family labor: (per hour)									
Apr.-May	.00	.00	.00	.00	.00	.00	.00	.00	.00
June-July	7.55	7.55	7.55	7.55	7.55	9.95	7.55	7.55	9.75
Aug.-Sept.	.70	.70	.70	.70	.70	.00	.70	.70	.25
Oct.-Nov.	.15	.15	.15	.20	.20	.00	.15	.20	.00
Investment capital (per dollar)	.05	.05	.05	.05	.05	.02	.05	.05	.02
Land: (per acre)									
Cropland	54.55	54.40	54.40	54.35	54.60	39.50	54.50	54.55	38.60
Tobacco allotment	147.70	146.20	146.20	146.90	147.70	a/	147.25	148.40	a/
Cotton allotment	a/	a/	a/	a/	a/	47.80	a/	a/	a/

a/ Allotment was not limiting.

Appendix Table 10. Most profitable enterprise combinations, single-unit farms, 1.5 man-equivalents of labor less labor for off-farm job, no land rented in

Item	No additional capital			Lower level capital			Upper level capital		
	Cropland owned per farm			Cropland owned per farm			Cropland owned per farm		
	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres
Enterprises in specified units:									
Tobacco (ac.)	2.6	4.3	5.0	2.6	2.9	5.0	2.6	2.3	5.0
Cotton (ac.)	1.9	2.8	0	1.9	1.4	0	1.7	.6	0
Corn (ac.)	2.6	20.8	42.8	7.9	17.1	42.8	2.7	15.6	42.8
Sweet potatoes (ac.)	7.8	.3	0	2.4	0	0	0	0	0
Wheat (ac.)	0	0	3.0	0	0	3.0	0	0	3.0
Layers (no.)	0	0	0	985	0	0	0	0	0
Hogs (brood sows kept)	0	0	0	0	14	0	16	21	0
(market hogs raised on concrete)	0	0	0	0	224	0	256	336	0
Labor hired (hours)	1,100	1,255	1,305	920	845	1,305	760	650	1,305
Total returns less cash costs	$2,815	$4,005	$4,905	$3,290	$4,130	$4,905	$3,630	$4,190	$4,905
Farm overhead costs	905	1,510	2,355	905	1,510	2,355	905	1,510	2,355
Net farm income	$1,910	$2,495	$2,550	$2,385	$2,620	$2,550	$2,725	$2,680	$2,550

Appendix Table 11. Value of marginal product for each limiting resource, single-unit farms, 1.5 man-equivalents of labor less labor for off-farm job, no land rented in

Limiting resource	Value of marginal products								
	No additional capital			Lower level capital			Upper level capital		
	Cropland owned per farm			Cropland owned per farm			Cropland owned per farm		
	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres	15.5 acres	29.0 acres	52.0 acres
Family labor: (per hour)									
Feb.-Mar.	.00	.00	.00	.00	.00	.00	.00	1.60	.00
Apr.-May	1.65	.00	4.40	.45	.00	4.40	.00	.00	4.40
June-July	.85	7.55	8.75	2.80	9.90	8.75	8.05	9.50	8.75
Aug.-Sept.	.45	.70	.00	.00	.00	.00	.70	.00	.00
Oct.-Nov.	1.15	.20	.00	1.60	.25	.00	.00	.35	.00
Investment capital (per dol.)	.14	.05	.00	.12	.02	.00	.04	.00	.00
Land: (per acre)									
Cropland	104.50	54.60	22.20	95.00	38.10	22.20	50.65	36.15	22.20
Tobacco allotment	540.25	147.80	a/	452.65	a/	a/	119.00	a/	a/
Cotton allotment	71.45	a/	a/	61.25	a/	a/	a/	a/	a/

a/ Allotment was not limiting.

Appendix Table 12. Value of marginal product for each limiting resource, 75- and 121-acre farms, two and three cropper families, respectively, operator's labor

Limiting resources	Value of marginal products									
	No land rented in				Land rented in					
	Farm operated as a multiple unit		Farm operated as a single unit		Farm operated as a multiple unit		Farm operated as a single unit		$14,200 av. capital 75-acre farm	
	75-acre	121-acre	75-acre	121-acre	75-acre	121-acre	75-acre	121-acre	Operated as a multiple u.	Operated as a single u.
Family labor: (per hour)										
Apr.-May	1.30	5.55	2.40	3.20	.55	5.55	10.55	10.55	4.25	10.40
June-July	3.30	7.65	.25	.00	7.15	7.65	.00	.00	8.10	.00
Aug.-Sept.	.80	.00	1.10	.95	.90	.00	18.05	18.05	.05	17.95
Oct.-Nov.	.00	.00	.35	.35	.00	.00	.00	.00	.00	.00
Investment capital (per dol.)	.10	.00	.15	.01	.05	.00	.00	.00	.00	.00
Land: (per acre)										
Cropland	87.90	25.15	105.50	103.70	54.45	25.15	a/	a/	28.45	a/
Tobacco allotment	409.40	65.00	555.35	560.76	155.65	65.00	375.00	375.00	60.20	375.90
Cotton allotment	79.55	b/	77.80	77.90	b/	b/	37.50	37.50	b/	37.70
Wheat allotment	b/	5.65	3.45	3.45	b/	5.65	13.40	13.40	b/	13.00

a/ Cropland was not limiting.
b/ Allotment was not limiting.

Appendix Table 13. Annual overhead costs, 15.5-acre farm

Item	Initial cost	Expected life	Depreciation[a]	Interest [b]	Insurance [c]	Taxes[d]	Repairs[e]	Total
	(dols.)	(yrs.)			(dols.)			
Tractor (small)	1,100	10	99.00	36.30	2.09	1.79	22.00	161.18
Two-disk plow	280	15	16.80	9.24	.53	.46	5.60	32.63
Disk harrow	300	15	18.00	9.90	.57	.49	6.00	34.96
Stalk cutter	160	15	9.60	5.28	.30	.26	3.20	18.64
Planters, fert. dist., and cultivator	300	10	27.00	9.90	.57	.49	6.00	43.96
Transplanter	300	15	18.00	9.90	.57	.49	6.00	34.96
Crop sprayer	200	10	18.00	6.60	.38	.32	4.00	29.30
Wagon or farm trailer	200	20	9.00	6.60	.38	.32	4.00	20.30
Misc. hoes, hammers, etc.	200	10	18.00	6.60	.38	.32	4.00	29.30
Section harrow	140	15	8.40	4.62	.27	.23	2.80	16.32
Tobacco barn	1,300	20	58.50	42.90	2.47	2.11	26.00	131.98
Equipment and tool shed	1,000	30	30.00	33.00	1.90	1.62	20.00	86.52
Utility shed, fert., etc.	1,000	30	30.00	33.00	1.90	1.62	20.00	86.52
Land	5,600	--	--	168.00	--	9.10	--	177.10
Dwelling ($5,000)	--	--	--	--	--	--	--	--
Total			360.30	381.84	12.31	19.62	129.60	903.67

---

[a] Straight line depreciation. Cost less 10 per cent salvage over life of item.
[b] Interest--half of cost plus 10 per cent salvage at 6 per cent.
[c] Insurance--half of initial cost at .38 per cent.
[d] Taxes--half of initial cost at .325 per cent.
[e] Repairs--initial cost at 2 per cent per year.

Appendix Table 14. Annual overhead costs, 29-acre farm

Item	Initial cost	Expected life	Depre- ciation	Inter- est	Insur- ance	Taxes	Repairs	Total
	(dols.)	(yrs.)			(dols.)			
Tractor (medium)	1,800	10	162.00	59.40	3.42	2.92	36.00	263.74
Two-disk plow	280	15	16.80	9.24	.53	.46	5.60	32.63
Disk harrow	300	15	18.00	9.90	.57	.49	6.00	34.96
Section harrow	140	15	8.40	4.62	.27	.23	2.80	16.32
Stalk cutter	160	15	9.60	5.28	.30	.26	3.20	18.64
Planters, fert. dist. and cult.	300	10	27.00	9.90	.57	.49	6.00	43.96
Transplanter	300	15	18.00	9.90	.57	.49	6.00	34.96
Crop sprayer	200	10	18.00	6.60	.38	.32	4.00	29.30
Wagon or farm trailer	200	20	9.00	6.60	.38	.32	4.00	20.30
Misc.--hoes, hammers, etc.	200	10	18.00	6.60	.38	.32	4.00	29.30
Tobacco barns (2)	2,600	20	117.00	85.80	4.94	4.22	52.00	263.96
Equipment and tool shed	1,000	30	30.00	33.00	1.90	1.62	20.00	86.52
Utility shed--fert. etc.	2,000	30	60.00	66.00	3.80	3.25	40.00	173.05
Land	14,600	--	--	438.00	--	23.72	--	461.72
Dwelling ($5,000)	--	--	--	--	--	--	--	--
			511.80	750.84	18.01	39.11	189.60	1,509.36

Appendix Table 15. Annual overhead costs, 52-acre farm

Item	Initial cost	Expected life	Depreciation	Interest	Insurance	Taxes	Repairs	Total
	(dols.)	(yrs.)			(dols.)			
Tractor (large)	$2,500	10	225.00	82.50	4.75	4.06	50.00	366.31
Three-disk plow	375	15	22.50	12.38	.71	.61	7.50	43.70
Disk harrow	300	15	18.00	9.90	.57	.49	6.00	34.96
Section harrow	140	15	8.40	4.62	.27	.23	2.80	16.32
Stalk cutter	160	15	9.60	5.28	.30	.26	3.20	18.64
Planters, fert. dist. and cult.	550	10	49.50	18.15	1.04	.89	11.00	80.58
Grain drill	550	15	33.00	18.15	1.04	.89	11.00	64.08
Transplanter	300	15	18.00	9.90	.57	.49	6.00	34.96
Crop sprayer	200	10	18.00	6.60	.38	.32	4.00	29.30
Mower	325	10	29.25	10.72	.62	.53	6.50	47.62
Wagon and farm trailer	200	20	9.00	6.60	.38	.32	4.00	20.30
Misc.--hoes, hammers, etc.	300	10	27.00	9.90	.57	.49	6.00	43.96
Tobacco barns (3)	3,900	20	175.50	118.80	7.41	6.34	78.00	386.05
Equipment and tool shed	1,000	30	30.00	33.00	1.90	1.62	20.00	86.52
Utility shed--fert. etc. (2)	2,000	30	60.00	66.00	3.80	3.25	40.00	173.05
Land	28,800	--	--	864.00	--	46.80	--	910.80
Dwelling ($5,000)	--	--	--	--	--	--	--	--
			732.75	1276.50	24.31	67.59	256.00	2357.15

Appendix Table 16. Annual overhead costs, 75-acre multiple-unit farm

Item	Initial cost	Expected life	Depre- ciation	Inter- est	Insur- ance	Taxes	Repairs	Total
	(dols.)	(yrs.)			(dols.)			
Tractor (large)	2,500	10	225.00	82.50	4.75	4.06	50.00	366.31
Tractor (small)	1,100	10	99.00	36.30	2.09	1.79	22.00	161.18
Two-disk plow	280	15	16.80	9.24	.53	.46	5.60	32.63
Three-disk plow	375	15	22.50	12.38	.71	.61	7.50	43.70
Disk harrow	600	15	36.00	19.80	1.14	.98	12.00	69.92
Section harrow	280	15	16.80	9.24	.53	.46	5.60	32.63
Stalk cutter	160	15	9.60	5.28	.30	.26	3.20	18.64
Planters, fert. dist. and cult.	550	10	49.50	18.15	1.04	.89	11.00	80.58
Grain drill	550	15	33.00	18.15	1.04	.89	11.00	64.08
Transplanter	300	15	18.00	9.90	.57	.49	6.00	34.96
Crop sprayer	200	10	18.00	6.60	.38	.32	4.00	29.30
Mower	325	10	29.25	10.72	.62	.53	6.50	47.62
Wagon and farm trailer	200	20	9.00	6.60	.38	.32	4.00	20.30
Misc. hoes, hammers	300	10	27.00	9.90	.57	.49	6.00	43.96
Tobacco barns (4)	5,200	20	234.00	171.60	9.88	8.45	104.00	527.93
Equip. and tool sheds (2)	2,000	30	60.00	66.00	3.80	3.25	40.00	173.05
Utility sheds (2)	2,000	30	60.00	66.00	3.80	3.25	40.00	173.05
Land	42,600	--	--	1,278.00	--	69.22	--	1,347.22
Dwelling ($5,000)	--	--	--	--	--	--	--	--
			963.45	1,836.36	32.13	96.72	338.40	3,267.06

Appendix Table 17. Annual overhead costs, 121-acre farm

Item	Initial cost	Expected life	Depre-ciation	Inter-est	Insur-ance	Taxes	Repairs	Total
	(dols.)	(yrs.)			(dols.)			
Tractor (large)	2,500	10	225.00	82.50	4.75	4.06	50.00	366.31
Tractor (small)	1,100	10	99.00	36.30	2.09	1.79	22.00	161.18
Two-disk plow	280	15	16.80	9.24	.53	.46	5.60	32.63
Three-disk plow	375	15	22.50	12.38	.71	.61	7.50	43.70
Disk harrow and section harrow	880	15	52.80	29.04	1.67	1.43	17.60	102.54
Stalk cutter	160	15	9.60	5.28	.30	.26	3.20	18.64
Planters, fert. dist. and cult.	550	10	49.50	18.15	1.04	.89	11.00	80.58
Grain drill	550	15	33.00	18.15	1.04	.89	11.00	64.08
Transplanter	300	15	18.00	9.90	.57	.49	6.00	34.96
Crop sprayer	200	10	18.00	6.60	.38	.32	4.00	29.30
Mower	325	10	29.25	10.72	.62	.53	6.50	47.62
Wagon or farm trailer	200	20	9.00	6.60	.38	.32	4.00	20.30
Misc., hoes, hammers, etc.	500	10	45.00	16.50	.95	.81	10.00	73.26
Tobacco barns (6)	7,800	20	351.00	257.40	14.82	12.68	156.00	791.90
Equip. and tool shed (2)	2,000	30	60.00	66.00	3.80	3.25	40.00	173.05
Utility shed (3)	3,000	30	90.00	99.00	5.70	4.88	60.00	259.58
Land	77,400	--	--	2322.00	--	125.78	--	2447.78
Dwelling ($5,000)	--	--	--	--	--	--	--	--
			1128.45	3005.76	39.35	159.35	414.40	4747.41

3

STATE LIBRARY OF NORTH CAROLINA

3 3091 00791 6612

8n

DATE DUE

APR	1 1 2011	757	23177
GAYLORD			PRINTED IN U.S.A.

Agricultural Experiment Station

North Carolina State College

Raleigh, N. C.

R. L. Lovvorn, Director of Research

Bulletins of this station will be sent free to all citizens who request them.